COMPUTERWORLD

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With New Terminal Family

IBM 'Unifies' Net Design Under SDLC

By Vic Farmer
and Tom Geyer
Of the CW Staff

WHITE PLAINS, N.Y. – IBM took the wraps off a "unified" telecommunications architecture for network design using Synchronous Data Link Control (SDLC) last week.

At the same time, it introduced a "framework" of new terminal products that will let users apply full-duplex SDLC techniques in general-purpose business applications. SDLC is a communications line protocol introduced last year with a series of specific controller-based systems for stores, banks and offices.

Now SDLC becomes the common protocol for "Advanced Functions for Communications" (AFC) networks with VS 370 host processors. Underlying the AFC concept is a "Systems Network Architecture" (SNA) that employs a common network control program and a common access method (Vtam), IBM said.

The all-embracing telecommunications structure distributes network control functions throughout networks, cutting both line costs and host processor overhead, IBM claimed.

The integrated plan consists of:

- Terminals with integrated control units or links to programmable controllers that automatically handle such tasks as initiating and ending transmissions.
- Previously announced IBM virtual storage CPUs operating with Vtam, IBM 3704 or 3705 communications controllers with Network Control Program (NCP/VS), and SDLC.

IBM said some hardware and the software and support necessary for AFC and integrated SDLC use won't be ready until late 1975. But the 3767 and 3770 terminals announced last week will be available within six months and can be used with present 2471 or binary synchronous line control (See Page 4).

The uniform architecture of AFC allows a variety of IBM terminals to operate over a single full-duplex line to help cut communication costs, according to IBM.

Distribution of network control functions has been accomplished in part with the extensive use of large-scale integration (LSI) technology for buffers and transmission controllers inside remote terminals, the company said.

IBM also claims users can install additional terminals at remote locations with little or no modifications to existing applications programming. The unified communications structure is said to simplify connections among controllers, lines and terminals in addition to standardizing line control methods, line speeds and access methods.

SDLC under SNA permits as many as seven messages to be sent before a response is required from the receiving de-

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The IBM System/3 Model 8 is a "cardless" system designed for either batch processing or on-line data entry and inquiry.

IBM Has Cardless S/3; 3/15 Users Get 3340 Disk

By Vic Farmer
Of the CW Staff

ATLANTA – IBM introduced a new System/3 last week – the Model 8 – that features an Integrated Communications Adapter (ICA) and no provision for card I/O, unlike earlier models in the series.

The General Systems Division here said also that the 3340 Direct Access Storage Facility and 3348 disk module can now be attached to the System/3 Model 15.

The Model 8 can be used either for batch processing using a directly attached 3741 data entry station for input and output, or for on-line processing using the 3270 CRT for data entry or inquiry, IBM said.

Semiconductor main memory is available in four sizes ranging from 16K to 64K bytes. Memory operates with the same instruction sets, cycle time and access speeds as the larger System/3 Model 10, IBM said, though the memory on the older model is core.

The ICA permits one remote and two local communications lines to be connected to the Model 8. Standard binary synchronous communications is also offered.

A minimum practical configuration including a 16K CPU, 2.45M byte disk, single 3741 data entry station and 100 line/min printer rents for $1,584/mo. A typical configuration would have a monthly rental of $1,849 and purchase

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Scanning, Program Snafus Delay D.C. Primary Tally

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – Hardware and software malfunctions combined to cause a serious snafu in vote tallying in the primary elections here last week.

More than 10,000 rejected ballots had to be counted by hand and the final election totals were still not available 22 hours after the polls closed Tuesday night, an election official said.

Vote totals in the D.C. mayoral election and other local contests were to have been processed on a Control Data Corp. (CDC) system leased by the Board of Elections. Officials expected to make the final vote count available for public announcement soon after the polls closed at 8 p.m.

The plan called for the hand-marked paper ballots from local polling places to be scanned by three optical scanners installed in the District Building. The scanners were to process the ballots and then generate magnetic tapes.

These tapes were then to be processed on a CDC 1700 for the final totals.

However, early on Tuesday afternoon, the scanners began to reject many paper ballots because they had not been marked uniformly.

Apparently the scanners had been set up to recognize only shaded-in blocks alongside candidates' names in each contest. But some voters put an "X" or a checkmark. Others voted only in a portion of the races, leaving some choices blank.

The scanners had apparently not been programmed to accept these ballot exceptions and as a result between 10,000 and 12,000 ballots had to be counted by hand.

To compound the difficulties, a malfunction in the vote counting system processing the tapes at the District Building forced officials to transfer the tapes to a second CPU.

But programming for the second main-

(Continued on Page 2)

Need for Compatibility to Temper 1984 Systems, Info Session Told

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – The computers of 1984 will offer users "more processor power, more functions and more headaches" even though they won't necessarily call for massive reprogramming, panelists at an Info '74 session on "Future Considerations for Configuration Planning" agreed last week.

"The systems of 1984 will be quite a bit different from today's," Kornel Spiro, manager of market analysis for Amdahl Corp., said, but he indicated that "the need for compatibility will moderate revolutionary movement."

The radically different future systems will appear on the scene definitely in the 1982 to 1984 time span, he said, noting the major question today is how far advanced the systems of 1977 to 1982 will be.

They could be either mere extensions of present computer architecture, he said, or scaled-down versions of the revolutionary systems to come.

But at present it is impossible to tell

See inside for more Info '74 coverage.

whether the move to the future systems will be in one jump or several small steps, he said, pointing out there probably will be several attempts at future operating systems before they are fully developed.

The future systems will be simpler for users to understand, use and operate, and they will be able to function on today's data bases because users will not tolerate

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Action Week

While three national conferences for computer builders and users were going full swing on both coasts last week (Wescon and Compcon coverage inside), quiet announcements from Atlanta and White Plains brought a raft of new or enhanced IBM products into the world.

Most importantly, IBM's Synchronous Data Link Control (SDLC) communications discipline came to the fore.

The news in brief:

- System/3 Model 8 – a cardless System/3.
- A 3340 disk-drive attachment to the System/3 Model 15.
- A unified teleprocessing scheme based on SDLC – "Advance Function for Communications."
- Brief details of the SDLC systems network architecture (SNA).
- 3767 interactive SDLC keyboard/printer terminal.
- SDLC models of the 3270 information display system controllers.
- 3771 remote remote batch terminal with card I/O only.
- 3773 remote batch terminal with diskette storage only.
- 3774 remote batch terminal with card I/O and diskette storage.
- 3775 remote batch terminal with integrated line printer.
- 3501 50 card/min card reader for the 3770 Series.
- 3521 50 card/min card punch for the 3770 Series.
- 3782 card punch controller for the 3521.
- 3784 line printer for the 3774.
- Doubling of the number of terminals attachable to the 3790 SDLC communications system.

On the Inside This Week

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
The Key to a Run Out

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User's Needs to Temper 1984 Revolution

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new equipment forcing them to reprogram today's investment in such systems, he said.

The current data and programs will not be obsoleted in the 1977 to 1981 time frame, he said, but there may be changes after that.

Any of the new systems, for example, will have some sort of compatibility mode for running older programs, he said, even though users might be forced to write all new applications in newer, higher-level languages.

In the 1982-84 systems, however, possibly only programs written in the newer languages will be usable.

Developments in the semiconductor industry will force the development of new systems, he said, adding there will be big increases in component density, huge reductions in cost and only small increases in speed over today's high end.

Because of this, microcomputers will proliferate and be everywhere, including autos, appliances, TVs, toys and calculators, he said.

So, on one end, the systems of the future will be applications-oriented turnkey systems priced between $1,000 and $100,000. They will be extremely easy to use, require no operators and minimum maintenance. Despite their extremely small size, they will have the power of today's small- and medium-sized systems.

At the high end of the line there will also be extensions spurred by the consolidation of resources in large centers and the growth of large applications.

Uniprocessor Predictions

Today's uniprocessors will undergo a performance improvement of from two to four times over the next 10 years, Spiro said, but added this would not be a large enough increase to satisfy users' future needs.

Presently, the solution is to add additional uniprocessors into a multiprocessor configuration, he said.

This trend will be extended, he predicted; future systems will be collections of these higher performance uniprocessors all sharing a common frame, systems console, power supply, cooling equipment, special subprocessors and some, if not all, of the memory in the system.

Consequently, users will be able to add processing power in modular increments much like they add memory onto a system today.

Such systems will feature around-the-clock availability, since some processors can go down without bringing the whole system down; greater economy because of the sharing of facilities; and much bigger memory.

On that point, he indicated memory prices will drop 50 to 100 times within the next decade, and the manufacturing cost of memory might drop even faster.

In the realm of software, the new systems will make the present virtual storage systems obsolete. Operating systems will be simpler and therefore take up less CPU overhead, Spiro said.

But, he added, a new form of virtual storage will be developed that will allocate real memory in larger units, provide a longer lifetime for data in real memory and simplify control and address translation.

Other technological developments in the next decade will include the obsolescence of disk systems by faster nonremovable technologies, he said, even though cheaper and slower disks will still be in use for archival purposes.

Other progress in archival storage will include huge price/byte decreases and automatic systems for mounting archival storage.

The future in software is less clear than the outlook for hardware, he said.

Today there is an enormous amount of third-generation software characterized by large programs, large development costs and large maintenance costs. In addition, there are not very well-defined interfaces between software.

Fourth-generation software will be marked by more engineering development, he said, including structured programming and top down design, which should lead to shorter development times.

Operating systems will be simpler and therefore more error-free, he said, and more resistant to protection penetration.

At the same time, more of the functions that are presently in operating systems will be embodied in hardware in the future, such as resource switching, auxiliary storage management and I/O supervision.

In addition, the interface within a program will be better defined and programs will be more machine-independent than at the present.

Compiler writing will be a semiautomatic function in the future, he added, which will lead to a proliferation of compilers for specific tasks or applications.

Attendees take in the sights on the exhibit floor at Info '74.

Scanning, Programming Snafus Delay D.C. Primary Vote Count

(Continued from Page 1)

frame was also incomplete and another processing failure occurred, finally forcing Board of Elections officials to run the tapes on a third CPU at the Office of Planning and Management.

The source of the problem couldn't be isolated immediately, according to a CDC spokesman. A Board of Elections official explained simply that "the computer broke down, that's all." And a telephone operator at the District Building told callers the EP department wasn't answering the phone.

At about 3:30 a.m. Wednesday morning one local TV station finally abandoned its live election coverage. Newsmen advised viewers to get some sleep since it would be impossible to get final vote totals until later in the day.

At 5 a.m. an official of the Board of Elections announced that further technical difficulties made it impossible to process the last two tapes. In addition, it was estimated that between 10% and 15% of the ballots cast were rejected by the scanners.

Late on Wednesday, a CDC spokesman described the vote counting system as "something we put together to try out," adding that the system was "never intended for operational vote counting."

Later, CDC spokesman Ralph Sheehy retracted this statement and said the system had been checked out successfully Sept. 10. The system suffered "one or more malfunctions," Sheehy said, and CDC is undertaking "a complete review" of the event.

During the day on Wednesday, Clifford Alexander conceded the mayoral race to the present Mayor, Walter E. Washington. At that time he was losing by 4,000 votes, but he qualified his concession with a statement that he might prove to be the victor when the final totals were available.

At the same time, Alexander called on his victorious opponent to set up a study committee to investigate the vote counting procedures used by the Board of Elections. An official of the board also called for a study, saying the "whole use of computers should be reconsidered," especially in light of upcoming general elections in November.

Ironically, only about 40% of the 106,000 registered voters turned out for the election. It could not be determined how much worse the computer malfunctions would have been if the vote had been heavier.

IBM Introduces Cardless S/3

(Continued from Page 1)

price of $72,075.

The 3340 disk drive for the 3/15 uses the 3348 Model 70 disk module, which normally provides 70M bytes of storage on 370s. On the System/3, however, format constraints reduce the main data area to 41M bytes with 4.9M bytes for program storage and 4.9M bytes for program backup, IBM said.

Therefore, the module itself is not compatible with 370 mainframes which format data differently on the data module.

The 3340 unit provides twice the storage of the present System/3 5445 disk pack, IBM said. Three 3340 drives are attachable, giving 82M, 123M or 164M bytes compared with 20M, 40M, 60M or 80M bytes with the 5445 configuration.

Average seek time with the 3340 on the 3/15 is said to be 25 msec compared with 60 msec on the 5445.

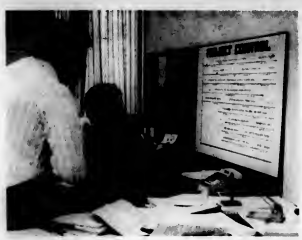
Two drives with a controller rent for $999/mo or $850/mo on the Extended Term Plan (ETP). Purchase price is $40,000. A single drive without controller rents for $558/mo, $475/mo ETP or $22,000 purchase.

Both the Model 8 and 3340 for the Model 15 will be ready for delivery in June 1975.

System	3/6	3/8	3/10	3/15
Memory Range (K bytes)	8-16	16-64	8-48	48-128
Memory Type	Core	Mosfet	Core	Mosfet
Cycle Speed (µsec/byte)	152			
Disk Range (M bytes)	2.45—9.8	2.45—9.8	2.45—51.76	4.9—164
Printer Range	85 Char./sec	100—300 Line/min	100—1,100 Line/min	465—1,100 Line/min
Software	RPG-II source language except I/O dependencies			
	Fortran/Cobol			
Minimum Practical Configuration Price	8K $1,043/mo	16K $1,584/mo	12K $1,583/mo	48K $4,383/mo

Comparison of System/3 Line

PHASE 2 OF SYSTEM LIFE: IMPLEMENTATION



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System implementations don't seem to be improving much. Most projects still come in late, and over budget.

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The Translator diagnoses syntactical errors, and identifies inefficient COBOL—using ADR's criteria or yours. The other MetaCOBOL modules, the Test Data Generator and Run-Time Debugging Aid, simplify and improve test procedures and the elimination of logical errors. And the COBOL Performance Monitor can provide a short-cut to finding production execution inefficiencies.

Before any code exists, use the CHART language of Autoflow II's Automated System Charter to create system diagrams automatically, and update them easily.

As code accumulates, use Autoflow II's language Module Analysis Processors to tabulate all data-name references and statement labels. And to summarize all statements which alter selected data, grouped by data name.

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Terminals, Modified 3270s Key to SDLC Application

By Vic Farmer
Of the CW Staff

WHITE PLAINS, N.Y. – The key to practical application of IBM's Synchronous Data Link Control (SDLC) is a series of new keyboard printer terminals and modified 3270 CRTs.

IBM projects first deliveries of most SDLC-oriented equipment during the last quarter of this year and the beginning of 1975, but 3270 SDLC terminals won't be available until November 1975, IBM said.

In the 3270 family of controllers and display stations, four new SDLC-only controllers are planned: 3271 models 11 and 12 and 3272 models 11 and 12. Field upgrades for earlier 3271 and 3272 models will cost $826 to $2,985 for users of purchased equipment. Rental customers will get new controllers.

Integrated Control

The keyboard printer terminals, featuring integrated control units, are the 3767 communications terminal and four members of the 3770 data communications system: 3771, 3773, 3774 and 3775.

The 3767 – successor to IBM's 2401 and 2402 terminals – is designed to handle interactive application tasks such as data inquiry and update, low-volume data entry and problem-solving. Reports, labels and other hard copy will be printed through the terminal's bidirectional matrix printer.

This printing mechanism alternately prints lines from left to right and from right to left. It is engineered to take the shortest path from the end of a line to the next print position, reducing the delaying effect of unnecessary carriage movement, IBM said.

The 3767 terminals are available with either a 48 char./sec print speed with optional 512- or 1K-byte buffer memory, or 80 char./sec print speed with a 512-byte buffer memory expandable to 1K bytes. The buffer permits keyed data to be corrected and edited before transmission, IBM said.

When the 3767 is off-line, the unit can be used as a typewriter or a calculator through an optional off-line calculate feature. As a calculator it is capable of standard exponential, logarithmic and trigonometric functions. The 3767 was designed by IBM Japan.

The 3767 terminal is compatible with start-stop line control so that users of 300 bit/sec or faster 2740 and 2741 communication systems may incorporate the 3767 into their present operations.

Under SDLC line control, the 3767 is said to transmit at rates up to 1,400 bit/sec. A keylock and magnetic stripe card reader are optional.

Monthly rental ranges from $161 to $285 under the Extended Term Plan (ETP); $189 to $336 under the Monthly Availability Charge (MAC). Purchase prices range from $6,185 to $10,000. Shipments will start in the first quarter of 1975.

Remote Batch

The 3770 terminals, although they can be used interactively, are intended mainly for remote batch applications. During online batch operations, for example, data sent to a 3770 device can be printed or stored on diskettes or 80-column punched cards, or information can be transmitted to the central computer from diskettes or punched cards. Transmissions from diskette-based systems are faster, IBM said.

The 3770s represent a possible upgrade for users of 1050, 2077, 3735 or 2740 equipment, the firm added.

Besides SDLC operation, the 3770 terminals operate with existing binary synchronous line control (BSC) networks. With BSC a terminal is linked to any 370 by teleprocessing lines and a 3704 or 3705 communications controller, or through an integrated communications adapter on the 115, 125 and 135.

The four terminals are available with features that permit communications over both switched and nonswitched lines at speeds up to 4,800 bit/sec, IBM said. Two 256-byte buffer memories are optionally available for temporarily storing keyed data.

The 3771 terminal offers the same basic matrix printer used in the 3767, but optional attachments include a 80 line/min card punch, the 3521, and 50 line/min card reader, the 3501.

ETP monthly rental ranges from $228 to $360, MAC is $268 to $424. Purchase is $9,720 to $14,400.

The 3773 terminal substitutes an integrated diskette drive for the 3771's card I/O. ETP monthly rental ranges from $298 to $430; MAC, $350 to $506. Purchase is $12,520 to $17,200.

The 3774 terminal is equipped with the 80 char./sec printer, but 300 card/min 2502 card readers can be attached in addition to the 3501. The 3774 can use the 3521 card punch and one or two diskette drives may be attached. An additional option is a 120 line/min belt printer, the 3784.

The 3774 ETP ranges from $313 to $548; MAC, $368 to $645; purchase, $12,520 to $21,920.

The 3775 has the same capabilities as the 3774 but incorporates the belt printer instead of the matrix printer. ETP monthly rental for this unit ranges from $443 to $668; MAC, $509 to $768; purchase, $17,320 to $26,720.

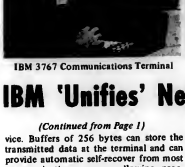
Readers and Punches

The new 3501 card reader and 3521 card punch are desktop units that run at 50 card/min. The 3521 is also available with features that allow it to print information on a card and to function as a card reader. A 3782 card controller is necessary for attachment of a 3521.

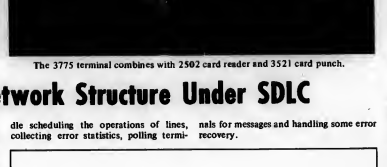
The new 3784 line printer, when equipped with a print belt of 64 characters, prints up to 110 line/min.

ETP monthly rentals for the 3501, 3521, 3782 and 3784 are $85, $175, $35 and $305 respectively; purchase, $3,400, $7,000, $1,400 and $12,200. First shipments are scheduled for the fourth quarter.

IBM has also doubled the number of terminals that can be attached to its 3791 communications system controller announced last December. This system is SDLC-oriented. Instead of a maximum of eight 480-character displays, the user will be able to attach 16; and instead of a maximum of four 1,920-character displays, the users will be able to attach eight.



IBM 3767 Communications Terminal



The 3775 terminal combines with 2502 card reader and 3521 card punch.

Sanders Plans Antitrust Suit Against IBM, Blames 'Monopoly' in $19.1 Million Loss

NASHUA, N.H. – Sanders Associates, Inc., posting a $19.1 million loss for the past year, said last week it will claim triple damages in an antitrust suit against IBM. The independent terminal maker, which sells 80% of its terminals for use on IBM systems, put the entire blame for its loss on "IBM's monopolistic marketing practices."

In a one-sentence response, IBM said, "it is regrettable that Mr. Sanders would explain his company's losses by alleging that responsibility lies elsewhere."

Royden C. Sanders, president of the New Hampshire-based manufacturing company, said his firm will file an antitrust complaint against the industry leader within 30 days. It will seek to recover three times its current losses as well as "previous losses and lost profits."

Sanders claimed IBM "retaliated" against its subsidiary, Sanders Data Systems, because it became "one of the early leaders in the terminal-oriented distributed processing market, the fastest growing segment of the computer market."

Among its "discriminatory marketing practices," Sanders charged, was IBM's refusal to support existing IBM interfaces used by independent equipment. Sanders referred specifically to IBM's decision that VS 370 users would be limited to 3270-type terminals with CICS and IMS data base systems [CW, Jan. 9].

IBM changed its mind – apparently because of threats of legal action from Sanders – and agreed to support 2260-type terminals on new mainframes.

"But to a large degree the damage had already been done," Sanders claimed. "New orders fell below expectations in 1974 and lease terminations increased significantly."

Sanders also cited IBM's withholding of interface specifications for new equipment as an anticompetitive marketing practice. The result of this policy is a shorter life for independent equipment and financial problems for manufacturers, Sanders said.

This year's loss contrasted with net earnings of $5.9 million, or $1.30 per share, on revenues of $171 million. Revenues dropped to $162 million this year.

Sanders said it earned $4.9 million this year on operations, but dipped into the red after devaluing inventory by $4.8 million and absorbing an "accounting change" that brought the loss to $19.1 million or $4.17 per share.

Sanders said his company remains "a viable force in the terminal market."

IBM 'Unifies' Network Structure Under SDLC

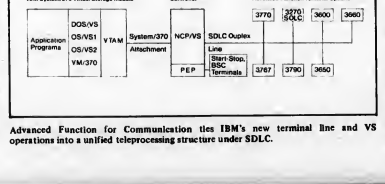
(Continued from Page 1)

vice. Buffers of 256 bytes can store the transmitted data at the terminal and can provide automatic self-recover from most communications errors, allowing processing to continue without interruption, IBM said.

The 3704 and 3705 controllers, when equipped with the Partitioned Emulation Program Extension, allow application programs to operate over existing 2741-type or binary synchronous transmission lines, while Vtam uses the communications controller to access SDLC lines.

The 370X controllers can also be used as remote concentrators to collect messages from low-speed lines and transmit them over high-speed lines to the computer.

The Network Control Program/VS works in conjunction with Vtam to handle scheduling the operations of lines, collecting error statistics, polling terminals for messages and handling some error recovery.



Advanced Function for Communication ties IBM's new terminal line and VS operations into a unified teleprocessing structure under SDLC.

Consultant Sees General Satisfaction

Few Faults Found by Users of Specialized Carriers

By Ronald A. Frank
Of the CW Staff

NEW YORK – Data communications users with lines supplied by the specialized common carriers are generally more satisfied than they were with their previous carrier, according to Harry Newton, a telecommunications consultant who spoke at an Info '74 session on "Advances in Data Communications."

In addition, these users are receiving good service, saving money and are especially pleased with the new-found spirit of innovation on the part of the specialized carriers, he said.

With competition among the new carriers, the price of private-line facilities has been going down rapidly while the price of dial-up calls is rising, Newton explained.

Because of this trend a user now needs only a few hours of communications each day between two points in order to justify the installation of a private line, he said. "The economics are switching unbelievably fast to leased lines," he added.

The major limitation to the facilities available from the specialized carriers are the local loops provided by local telephone companies.

Since these are usually analog, the new carriers are forced to use modems and this adds to the user's cost. It also reduces the user's flexibility and can impair overall transmission quality, Newton said.

The consultant called Data Transmission Co. (Datran) the most expensive, most technologically advanced and the "most hyped" of the new carriers. Although at present Datran offers only private-line point-to-point services between Houston and St. Louis, the latest plans call for Dstran to complete its first all-digital switch in Brunswick, Ill., within the next few months, he said.

The largest of the new carriers is MCI Telecommunications Corp., which has more employees than the other specialized carriers combined, has the largest number of data users as customers and is now serving the most cities (20) in the country, he said.

Another potential contender is U.S. Transmission Systems, an ITT subsidiary, which will get FCC approval to construct its first sites very soon, he predicted. He described the firm as keeping a very low profile and said little had been done since the company first applied for approval from the FCC last July to operate between Houston and New York.

IBM has applied to enter the satellite carrier field, Newton remarked, because it recognizes the growth of dispersed computer networks is "increasingly limited by the high cost and poor quality of the nation's communications network."

IBM's own communications technology in many cases is far superior to that being used by the telephone industry but IBM's growth is being limited by AT&T's "stubborness and unwillingness to innovate," Newton told the conference.

Even with FCC approval IBM's current satellite plans talk about the late 1970s and this is not soon enough for satellite facilities, he said.

Speaking about design criteria for configuring networks, Ralph Berglund, session chairman and communications consultant, said the lower cost of private lines now makes marginal applications "more attractive." The user must consider system performance and be sure functional requirements of a network are met before the question of costs can be addressed.

Communications systems don't require the latest tariffs in order to be effective, Berglund said, and a change in network specifications from five to six seconds response time in an inquiry application could save a company as much as $50,000 annually.

Echoing the call for proper planning by the data user, B.V. O'Brien of the Western Union Data Services Co. advised attendees to carefully identify system requirements before making a selection from the many types of communications terminals currently available.

The manager of market planning urged users to pay special attention to the man/machine interface and the requirements for the remote transmission of data.

"To cushion the impact of technological overchoice, we are forced to spend more time defining the problem," he cautioned.

CW at Info

Software Closing Management Gap

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – The chasm still yawns, but a bridge built on a foundation of software is slowly being erected between top management and the data processing departments in many areas, last week's Info '74 show indicated.

Software was clearly the key to the management audience for both the show's technical sessions and exhibits although the arrangement of the exhibits and sessions itself showed serious "system" design problems.

Since the exhibits and technical sessions were spread between three separated facilities in a muggy New York, attendees were forced to spend a great deal of time walking – or else missing parts of the overall program.

Many chose the latter, either sticking with the technical program or a quick visit to the exhibits.

But in each area software was prominent.

More software vendors participated than in any show in recent memory, but with few new products. The emphasis was clearly on using older products and systems more efficiently to meet management objectives.

The same was true in the technical sessions area – few spanking new developments, but rather implementations of older ideas and techniques and emphasis on case histories of such applications.

The American Management Associations, sponsor of the technical side of Info '74, clearly planned for this type of show and audience – not for the technical experts, but rather the implementers.

Foot-Dragging Recommended for OS Users

IBM Software Announcements Indicate VS 'Inevitable'

By Don Leavitt
Of the CW Staff

NEW YORK – It really doesn't matter whether IBM's Virtual Storage is a better system for the users or merely better salesmanship by the vendor – users will inevitably have to move to the new environment, according to Jack M. Berdy, president of On-Line Software International.

Looking back over all the software announcements put out by IBM since the initial VS announcement in August 1972, he drew the obvious conclusion that every serious enhancement is now being implemented so that it will run only in a VS mode.

DOS users can make the changeover anytime, but OS users can save money by waiting as long as possible before converting to VS, Berdy told an Info '74 session exploring "The Value of Virtual Storage, its Benefits and Costs." The more cost-effective plan, he noted, "is to add more main storage and keep on working in conventional MFT and MVT environments as long as you can."

User's Confirmation

Berdy's list of the potential benefits awaiting the VS user were confirmed later in the session by Shirley Fay, assistant vice-president of Security National Bank, Melville, N.Y. As the bank's head of software support, she had just been through a two-year changeover from DOS-based 360/50s to an OS/VS2-based 370/145-370/158 combination.

Once it found that MFT wasn't enough of an upgrade from DOS to keep things moving, the bank looked for speed or throughput improvement, an operating system with more internal facilities, ease of handling for the operators and potential for future development. A home-grown job-processing system "had just about eaten up the 512K 145," she explained.

Benchmarks showed Fay that individual jobs took as long on a 145 with VS1 as with MFT, but that the total job stream took less time since more jobs were handled at-one time. At test time, she added, VS2 was still in bad shape. Both individual jobs and the total stream took longer than under MFT.

Ease of Handling

But VS2 came out with a plus score in the bank's evaluation of ease of handling, Fay noted, whereas VS1 came out with a minus sign, compared with MFT. The requirements of JES (Job Entry System) with VS1 were far more difficult than the Hasp environment the operators were used to, she noted.

Working with the facilities available under the VS environments, Fay rated VS1 one plus and VS2 two pluses, again compared with the facilities she had under MFT. The same relative scoring showed up when the bank looked at probable future development, in terms of the bank's workload and the operating system's potential.

The vice-president noted she had the teleprocessing application implemented first and "certainly the response time dropped sharply." Tuning of the system, however, has now brought the response time down to a "livable" four seconds and allowed two other jobs to be running at the same time.

CW at Info

Tuning involved use of SMF data, read-out and analysis of data from a Microsum hardware monitor and dynamic measurement and reporting (on the console typewriter) of paging rate and CPU utilization percentages. While variations in virtual-to-real storage ratios, reserving more areas for the paging pool, and other internal tuning changes helped, the use of 3330 disk systems in place of 2314s made the biggest changes, Fay said.

Even though Security National now has two 1M-byte systems, it has made no particular change in the programming staff. Fay now has four on her staff, having hired one since the changeover started. They work largely in Cobol and BAL, with very little Fortran and PL/1, she said.

The workload includes many small jobs as well as a few large and important programs. It is the preponderance of the small jobs that has prevented the bank from having more than "eight to 10" initiators in concurrent operation on the 158, or more than "seven or eight" at a time on the 145. "Operators just cannot keep up with any more tape handling chores," Fay explained, "even though they seem to be quite happy with the system. And proud that they are in one of the earliest VS2 shops."

Individual or Group

Administrator Crucial 'Buy' in DBMS

By Don Leavitt
Of the CW Staff

NEW YORK – All generalized data base management systems (DBMS) "fall flat on their faces in the area of setting up real controls" and that is why users should "buy a data base administrator (DBA) first" when the decision to go to a DBMS is made, according to Lee R. Prescott, systems director of Travelers Insurance Co.

Speaking to an Info '74 session on data base concepts, Prescott noted the administrator might be an individual or a group.

"But it needn't be a small army," he said, adding Travelers has only 10 people on the DBA staff serving two divisions.

Most systems staffs have at least one real byte-chasing hotshot, the session's panelists agreed, "but at Travelers they've been considerably washed" to work with real problems for the users, "not just elegant solutions to unreal problems," Prescott added.

The basic problem, he went on, is to be ready to deliver something fast. Many end-user departments remember the unfulfilled promises of the management information systems of the mid and late '60s.

"If you can't show something in a year, forget it," he advised.

On the other hand, he noted, users are getting more sophisticated in their expectations. Although the DP staff certainly shouldn't tackle a complete conversion to DBMS at one time, or even the toughest application first, "putting too simple a project on the system first will lead to nothing but scoffing even when it works well," the insurance man said.

Alluding to the commonly held view that users must define their current and future DP requirements before they can realistically choose a DBMS, Prescott quipped the best he could hope was that his staff could somehow divine what those needs might be.

The impact of the use of DBMS might be – probably should be – so great that anything more serious than a guess would be foolish, he said.

Picking up on Prescott's discussion of the possibilities, good and bad, of purchased vs. home-grown generalized DBMS, Dr. Jack R. Buchanan of Carnegie-Mellon University urged the overflow audience to "at least consider" the use of a specialized data handling system, especially if their needs are unusual.

He spelled out the objectives of the generalized systems and admitted they have "very definite virtues – if you need them" but they impose various elements of overhead that might well be unjustifiable in light of the work to be done.

Part of the overhead, he noted, would unquestionably be a revision in the data flow through an organization. Beyond that, however, the new data flow could lead to a reorganization of the user's company itself, Buchanan said.

As an example of a specialized task not requiring all the facilities of a generalized DBMS, the professor described various forms of litigation management systems. With these tools, he noted, the user wants to be able to get at a mammoth data base on a key-word-in-context or a specific word basis, with no calculation or computation facilities invoked.

This text-searching type of operation became prominent with both the Control Data Corp./IBM antitrust suit and in the Senate Watergate Committee deliberations.

Though most of the systems utilize indices to find the desired data, the material actually stored on the computer may range from full texts through abstracts and down to the indices only.

Buchanan also noted that Control Data apparently is now marketing the indexing scheme it worked out during its court fight with IBM. With it, users can identify not only the keyword data but where and when it was created and when and where it is being used in current litigation, according to the professor.

Although specialized approaches overcome some problems inherent in the generalized DBMS, Buchanan admitted they can involve "multiple layers of system software."

Software Houses, T/S Vendors Turn Out in Force

By a CW Staff Writer

NEW YORK – Although several software packages and remote computing services were introduced at Info '74, the exhibition seemed even more remarkable in the number of software and service vendors it attracted – even if they had nothing bright and shiny new to show the world.

There were representatives from 10 or 15 software houses, as well as eight or more networks, on the Coliseum floors. Generally those who had nothing new for the show were demonstrating some recently announced capability for the first time.

As a result, users whose in-house hardware needs were pretty well fixed still had plenty of things to consider for upcoming applications.

Packages for in-house implementation included a completely new payroll system from General Computer Services, Inc., a pair of text processing and data retrieval routines from Base, Inc. and a new version of the Case computer system simulation package from Tesdata Systems Corp.

The new service capabilities illustrated how far the "time-sharing" networks have evolved from the days when their forte was engineering-type problem-solving. Now, On-Line Systems has an updated version of its data management system, Oliver, and Compu-Serv has introduced a remotely activated charting facility, with the potential for output in four colors.

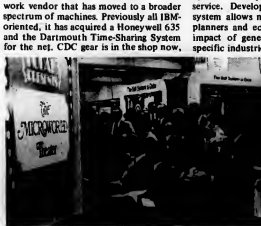
Xpress, just introduced by Tymshare, Inc., adds substantially to the financial modeling facilities available on that net, while Pics 2000, based on the System 2000 data base management system, provides production and inventory control support on Sci-Tek's system.

Spokesmen for Service Bureau Co. (SBC) described the continuing merger of the former IBM subsidiary's operations with those of Control Data Corp.'s Cybernet and the facilities of ITT Data Services, also acquired by CDC since SBC was taken over in the antitrust settlement.

Grumman Data Services is another network vendor that has moved to a broader spectrum of machines. Previously all IBM-oriented, it has acquired a Honeywell 635 and the Dartmouth Time-Sharing System for the net. CDC gear is in the shop now, too, and the growing number of Decsystem-10s are being installed in the computer center by the Boston-based Grumman subsidiary, Comp/Utility.

Software support for its old-line 360/67 was extended earlier this year, Grumman noted, by the development and release of Dash, which allows data retrieval at a user's teletypewriter or CRT terminal.

Representatives from GE's Mark III service were demonstrating the Econoscope Beta system, part of the net's Management Analysis & Projection (MAP) service. Developed by Cybermatics, the system allows market analysts, corporate planners and economists to evaluate the impact of general economic changes on specific industries.



COMe to the Movies

Visitors of the Kodak exhibit took a load off their feet and were treated to a movie about the world of computer-output-microfilm.

Progress Report:

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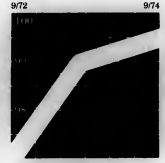

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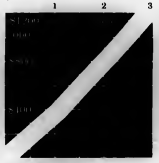

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IBM System/3 Users Greeted By 5 Peripherals Announcements

By Vic Farmer
Of the CW Staff

NEW YORK – IBM System/3 users reaped a good share of the new product activity at Info '74 with the announcement of five new peripheral products.

Decision Data Computer Corp. demonstrated its CS 200 96-column card-oriented data communications system. With the CS 200, the System/3 user can punch and verify data onto cards at a remote site and then transmit the card data directly to the central CPU or to another CS 200 over standard communications lines.

In turn, data can be transmitted to the CS 200 from the System/3.

In addition to punch and verify, the unit can reproduce, interpret, gangpunch and sort 96-column cards.

Synchronous data transmission speeds up to 9,600 bit/sec are supported. Cards can be punched at up to 120 card/min and read at up to 300 card/min.

Digital Associates Corp. 400 line/min System/3 printer gets workout.

The CS 200 is available with either an Ascii or Ebcdic data code structure.

Options available to the user of CS 200 include integrated modems, automatic answering, modulus 10 or 11 self-checking number, an 80- to 96-column card converter and a new 100 char./sec printer, the 1070 Data Reporter.

With the printer, the user can call for a printed copy of the data transmitted and sequence of transmission. The printer can also be used to receive messages and data from the central computer site, the firm said.

Both 80 and 132 print position models are available.

A third product introduced by Decision Data at Info '74 was a direct attachment Feature 1062 and a related software utility routine that permits a System/3 Model 6 user to read and punch card files in a manner similar to that of the System/3 Model 10.

Through this interface feature users can attach Decision Data punch card equipment to their CPU to gain an input reading rate said to be 10 times faster than the IBM 5496, in addition to output punching speeds up to 120 card/min.

The firm said no reprogramming is required to implement existing card applications originally designed for the 5496. The Data Recorder Attachment is available as an optional feature on the firm's 9601, 9610 and 9660 card-handling equipment and with this option rental prices range from $198- to $245/mo.

The 1070 printer can also be attached to the firm's System/3 Model 6 card stations and is priced at $130- to $205/mo. A 132 print position unit costs $5,550.

Monthly rentals for the CS 200 range from $195 to $498 depending on the contract term and configuration. Purchase prices range from $10,150 to $19,460. Decision Data is at 100 Witmer Road, Horsham, Pa. 19044.

Printers Unveiled

Digital Associates Corp. (DAC) unveiled 400- and 700 line/min printers that are said to operate under the standard System/3 supervisor and normal I/O support routines.

CW Photos by V.J. Farmer

Decision Data Computer Corp. demonstrates CS 200 96-column card-oriented data communications system.

The equipment is basically a Data Printer Corp. Chaintrain printer interfaced to System/3s.

The DAC/3 printer uses an Ebcdic 48-character set and prints 10 char./in. at 6 line/in. over 132 columns.

The Chaintrain is composed of character links riding on a monorail track which insures alignment, DAC said.

The DAC/3 400 line/min printer rents for $415/mo on a three-year lease and is priced at $15,000. The 700 line/min printer leases for $725/mo and is priced at $19,600.

DAC is at 24 Old Kings Highway S., Darien, Conn. 06820.

Kybe Corp. announced a tape cassette drive in four models that span a completely RS-232C or Digital Equipment Corp. PDP-8 interfaced model to a barebones transport-only configuration.

The CT-105 contains buffer and control electronics to read, write, edit, search and rewind and is priced at $1,835. The CT-103 has read/write control and interface electronics and is priced at $1,500.

The CT-102 and CT-101 are OEM-designed. The 102 is TTL-compatible and is priced at $875; the 101 transport only is priced at $600.

Kybe is at 132 Calvary St., Waltham, Mass. 02154.

Monitoring With Software Viewed Better Than Hardware Techniques

NEW YORK – Users can get more information with less trouble by using software monitoring techniques instead of hardware monitors, according to Richard A. Aschenbrenner, vice-president for technical services at Unicoll.

Speaking at an Info '74 session on "Evaluation and Planning for Improved Configuration Performance," Aschenbrenner indicated users could get approximately equivalent results with either monitoring technique, but the software devices give a clearer picture of the system in question for less cost.

Besides their relatively low cost, Aschenbrenner said software monitoring techniques are easy to use, while a high level of expertise is needed to interpret the relatively low-level measurements provided by hardware monitors.

But perhaps the greatest advantage of software monitors is they can give a clear picture of the operation of the operating system and applications software within the system.

Data from hardware monitors, for example, is virtually worthless if it cannot be correlated with the specific software profile at the time of the measurements, he stated.

But with software monitoring, he said, users can get detailed control block information on queues in serially used resources and can take a close look at such things as data sets and the like by name.

Software, of course, takes up some valuable core and the activity of the monitoring system might distort the measurements to a degree, he admitted, but he also pointed out hardware monitoring systems are prone to error and extremely expensive.

In the future, Aschenbrenner indicated, it may well be close to impossible to use hardware monitoring techniques at all, since the probe points are slowly disappearing into chips.

Other Techniques

Even before the user moves up to monitoring techniques, there are many techniques he can use to increase installation performance with little expense, Aschenbrenner said.

Simple job accounting can provide "significant information," but few people presently take advantage of it, he said.

All users should take a hard look at the data they collect in the job accounting function, he said, and evaluate methods for making it more useful in installation planning and system evaluation.

Setting the parameters for any measuring scheme is a "weak art" today, he noted, indicating parameters are largely chosen on the basis of experience, common sense and "well articulated guesswork."

After systems have been monitored, the user has several courses of action, ranging from changes in operational procedures to hardware and software modifications.

But once again, he noted, small changes can be significant, such as switches in job scheduling which can often bring 10% increases in performance.

Aschenbrenner said system monitoring and control can "have a significant effect on recovering DP resources" no matter what the changes made or techniques used.

Recently announced Inforex 5000 file management system draws crowd.

Overall Systems Receive Good Marks

DBMS Seen Biased Toward Indexed Sequential Storage

By Don Leavitt
Of the CW Staff

NEW YORK – "You can probably give a good B+ to most data base management systems (DBMS) and most vendors in the market today," according to James Tillinghast, vice-president of DBD Systems, Inc., a Long Island-based consulting firm.

Speaking to an Info '74 session on Acquiring a DBMS, he added, however, that most current systems are too strongly oriented toward indexed sequential data storage.

Such a bias works fine for retrieval of small pieces of individual data, he admitted, but doesn't make any real sense for large-volume data processing tasks such as payroll, which logically belongs on a pure sequential, tape-based system.

The DBMS vendors are beginning to recognize the need for tape support, but it's slow in coming, he added.

Study Needs

Earlier in the session, Dr. Peter Hill of Burroughs' Federal Systems Group set the stage for the overflow audience by noting the study of user needs – in terms of data – and of features that are available on the packaged DBMS should be essentially parallel operations.

"There's no use defining the user needs in a complete vacuum; nor should the search for what is available be limited to any preconceived ideas. Bringing the two search efforts together is a later part of the process," he said.

Hill stressed that the organization's needs must be the primary concern. And certainly one of the basic issues must be a determination of whether a full-blown DBMS is really needed. Even if a generalized DBMS isn't needed, or if the user's needs are so cloudy a determination cannot be made, "the use of data management principles is vital" to any organization, he went on.

The requirements analysis process outlined by Hill covers four areas beyond the organization and its objectives. Analysts have to consider the user characteristics, the data characteristics, the status of existing programs and the systems environment.

Range of Users

End users, he said, tend to form a spectrum from the parameter-bound airline reservation clerk who works with a very closely defined set of data, to the research analyst, whose data needs are unknown and unpredictable.

Supervised users of DBMS, Hill noted, include application and systems programmers and the data base administration function.

Evaluators have to look to existing programs to determine how well they can be integrated into the DBMS environment. This study includes a review of their complexity, the implementation language, the volatility of the program logic and the level of documentation.

Many functions that used to require special programming efforts will be handled "automatically" by DBMS. This means user libraries – in a permanent sense – will be smaller and the programs will be simpler. But as more users interact with the programs and the data, the libraries will very likely become more volatile as well, Hill said.

The choice of a DBMS is serious enough, he concluded, to be the determining factor in the selection of hardware, if the user is running his DBMS evaluation at the same time he is considering a system upgrade. The differences in DBMS can be that significant to the particular DP installation, he reiterated.

Not All Technical

For his part, Tillinghast noted users considering DBMS have a variety of problems to study before a final choice is made. And the problems are not all technical in nature.

As an example of a nontechnical but often overwhelming problem, he cited the range of personal communication channels that have to be maintained – in terms of completeness and clarity of what

CW at Info

is being said – between the user and the system analyst on the one hand, and between the analyst and the programmer on the other.

Looking back, Tillinghast noted conventional development cycles have led to frozen applications: the program logic determined how the data was to be stored; it was stored that way; and later applications that might have made use of the same data could not effectively get hold of it.

Flexibility

In contrast, he said, DBMS is aimed at flexible data structures and a variety of access and search methods. Centralized control over the physical organization of the data and the use of hierarchical storage techniques are essentially transparent to the end user, but these give the systems their flexibility.

Integrity of the data base against destruction or a security break is inherent in many DBMS and can be critical to many users, Tillinghast said.

He emphasized that internal quality can be just as vital as protection against physical damage. "A broken pointer record can cause as much loss of data as a broken water main," he quipped.

Make Managers Defend MIS Reports

By Nancy French
Of the CW Staff

NEW YORK – "If your management information system's effectiveness has to be measured, it probably isn't very effective," Jack Jones, management information services (MIS) vice-president for Southern Railways Systems, remarked at an Info '74 session here on MIS.

Long aware of a feeling of deficiency in the company management information tools, Southern Railways' president one day established as the company's only committee an information processing review board composed of three vice-presidents and the DP assistant vice-president.

He proclaimed all computerized reports discontinued unless each manager could justify the one he used.

In addition, all new management information projects had to be approved unanimously by the committee before they could be put into effect.

The company was stunned, Jones said.

Starting with the payroll manager, each manager appeared before the committee to justify his management information requirements and, "in the process, really educated himself about the operation of his department," Jones explained.

The system has worked so well that the committee was soon expanded to include 10 vice-presidents.

Unwieldy? Jones said no. The committee still meets once a month, with very few absences, to review all new projects.

Southern Railways is very happy with its management information program, and footing the information processing bills isn't a serious concern any more.

"The key to good management information tools is really understanding your company's management style. Then the MIS must fit," Jones said.

The stamp of approval from top management out front is a good way of assuring style, he said.

Best for the Money

Operating efficiency and how to get the best value out of each processing dollar was of keen interest to James C. Emery and Harvey Poppel, also on the program.

Chairman of the Decision Sciences Department at the University of Pennsylvania's Wharton School, Emery recommended the cost/benefit view as the most practical way of deciding how to develop a good information processing system.

He mentioned, however, that many decisions are made for the user in the area of cost and design by the needs of his information system.

High on the list of design decision-makers cited by Emergy were functions performed, content of output, selectivity of output, age or timeliness of output, accuracy of output and security of the system.

The objective of planners must be to bring value and cost together, Emery explained.

When the amount of return per dollar spent begins to level off, a system is probably good enough, he said.

"Perfection is too expensive," Emery pointed out. "Why buy a Rolls Royce when a used Volkswagen bug will do the job?"

To help determine priorities, Emery suggested planners solicit a list of priorities from users.

"Must they have it? should they have it? or would it merely be nice to have it?" all provide good insight in making the final cost/benefit choices, Emery explained.

"Efficiency is important when it means saving money," Emery pointed out.

In making recommendations for funding choices, Emery suggested the responsibilities of information processors lay in quantifiable areas.

"Identify alternative approaches, listing trade-offs," he said. "Then let top management make the more subjective judgments."

Approaching the matter of operations resource planning and improved productivity, Poppel said "DP exists solely as a supporting unit to those functions which generate the revenues and control the costs of doing business and should be evaluated by how well it performs that function."

The Booz-Allen & Hamilton, Inc. senior vice-president suggested zeroing in on a complete DP operations strategy consisting of three elements: specific service objectives, productivity measurements and a management plan.

As an example of productivity measurements, the information processing manager should determine unit costs, Poppel said. Then, because it is not really possible to reduce costs in absolute terms, "the principal objective of an DP operations manager is to meet specified service objectives at the lowest unit cost," he stated.

To accomplish this requires continued reporting on man/machine service and productivity measurements and a thoroughly developed problem/solution matrix for taking action on these indicators.

"Service and productivity measurements and actions are vital feedback into resource strategy development and planning function," Poppel explained. "Through successful resource planning and control, a company can save from 10% to 40% on information processing," he said.

Job Description Crucial to Career Pathing

NEW YORK -- Insisting that job descriptions for DP people be written by DP people, Dr. Frank J. LoSacco, a vice-president of Advanced Computer Techniques Corp., provided DP managers with yet another guideline for managing their professionals at an Info '74 session.

Sharing the podium with Philip C. Cross, LoSacco declared accurate job descriptions essential to any kind of organized career pathing or advancement for DP professionals.

He and Cross noted every job description should define certain variables: job responsibilities, job prerequisites and the degrees of supervision received and given by the position. When applied to a particular employee, he suggested the description also include where the person was recruited and what his or her expectations are, depending on the normal possibilities for advancement.

While his company writes job descriptions for individuals, LoSacco said these are not contracts, but rather vague guidelines indicating a person's interest in career development.

Contracts for such development do exist at Advanced Computer Techniques, but these are made under the particular direction of a career development officer, LoSacco remarked.

A new staff position, the career development officer, is charged with guiding and insuring the professional growth of the data processing staff. In addition to this responsibility, the officer controls funds devoted to training and assumes the defense of career development programs.

"We have created a situation in which a high-level person must be responsible to each individual staff member and to the needs of the organization as a whole," he said.

If someone fails to advance or a program flops, close attention to individual progress make the reasons for failure "easier to determine."

Managers Can No Longer Excuse Lack of Performance Measures

By Edith Holmes
Of the CW Staff

NEW YORK -- No more excuses remain to support the DP profession's claim that it can't measure the performance of its professionals, Philip C. Cross, senior director of operations at Educational Information Services, Inc., New Brunswick, N.J., informed an audience at Info '74 here last week.

In a room filled to capacity, Cross told the session on managing the DP professional that traditional arguments for making performance measurement someone else's responsibility would no longer suffice.

"Many in the profession continue to claim that either DP management lacks the necessary related education and experience to effectively control and manage its people, or DP types have taken advantage of the shortage of their skills to keep management at bay, or management throughout the company has not paid due attention to the increasing importance of DP in much of the company's management and product decision-making processes," he said.

But, according to Cross, while these conditions may have existed in the past, the profession should have outgrown them by now.

"DP has been around long enough for its functional management to develop and apply DP personnel resources more effectively," he noted.

Secondly, he argued, the "tag "sellers market" no longer applies to DP personnel.

Finally, "DP costs, failures and accomplishments have taught management in most companies the value of proficient and competent DP personnel," Cross contended.

Describing the task he asks the profession to perform as "a bottoms-up management process dependent on perseverance," Cross urged managers to apply performance measurement to all levels of DP personnel.

"Professionalism is a level of performance, an attitude and dedication in performing within and beyond the requirements of a job assignment," he explained. "Degrees, certificates, years of experience or titles do not in themselves make a professional." What matters is "how a person does his job."

Standards Essential

The development of a performance measurement system rests on the establishment of standards which will "enable a manager to construct a performance matrix allowing him to evaluate the work of each individual," Cross commented. Whether the standards emphasized are methodology-oriented, results and accomplishment-oriented or a combination of these depends on the kind of job to be performed.

For its part, management must assume responsibility for continually maintaining the performance measurement system by providing up-to-date and accurate job descriptions that should define job title, job functions, skills and abilities, administrative authority, educational requirements, experience requirements and promotion requirements.

In addition to making descriptions of jobs available to personnel, Cross concluded management should attend to the following tasks:

- "Identify, create and maintain all necessary methods and procedures critical to exercising effective management control and defining the guidelines, rules and regulations within which job assignments are to be accomplished.
- "Identify and define departmental and individual performance objectives which are in keeping with corporate goals, objectives and policies.
- "Establish and maintain an organizational structure that clearly identifies and properly places all work functions within functional areas and in relation to other functional areas.
- "Develop and update an operational strategy that takes full advantage of personnel expertise and capability while anticipating and building to meet future requirements.
- "Establish an appraisal system that clearly communicates to the employee what his performance rating is, what his strengths and weaknesses are and how his future development will proceed.
- "Identify and provide training and development which is in tune with work assignments and career opportunities.
- "Reward or punish performance or lack of performance either through merit increases or promotions, or through withholding merit increases, demoting or discharging."

Communications Users See Few Inroads

By Ronald A. Frank
Of the CW Staff

NEW YORK – Data communications was emphasized at a majority of the Info '74 exhibits, but few firms were using new products to demonstrate their communications software and services.

Among the terminals introduced at the show, Sanders displayed two CRTs which it said can be plugged directly into IBM 3270 applications without modification. Called the 8171 and the 8172, the CRTs include a 12K microprocessor, emulation software and system configurations which range up to 32 terminals and eight printers.

The Model 8171 is used for remote cluster configurations while the 8172 is used for local mode systems. Standard IBM 3270 terminal control functions are performed with the display and keyboard and the binary synchronous line control in the CRT systems is provided by control programs in the controller memory portion of each system.

In addition to 3270 compatibility, the Sanders CRTs have such features as dual intensity displays and a "photopen" option. They are designed to operate as on-line displays in inquiry/response, data entry, order distribution and similar user applications.

Two CRT terminals which can be plugged directly into IBM 3270 applications without modification were introduced by Sanders Data Systems. The Model 8171 can be used for remote cluster configurations, the Model 8172 for local mode systems.

CW Photos by V.J. Farmer

Com-Data Corp. introduced a modified Model 33 TTY. The modification allows the machine to operate on either dial-up lines or the TWX network.

CW at Info

An optional data validation feature in local mode can be programmed into the terminal using additional memory and software routines in the control program, the company said.

A cluster of five 8171 remote terminals with 1,920-character screen, keyboard, microprocessor and modem interface cost $637/mo on a four-year lease or $28,925 purchase. First deliveries of both models are scheduled for March 1975.

Datapoint added a 360/20-compatible Hasp workstation to its earlier remote batch terminal emulators. Using a 300 card/min reader, the workstation operates on-line to a 360/370 in a synchronous data format matching the line discipline of existing IBM CPUs, the company said.

Com-Data demonstrated a modification for the Model 33 TTY which enables the machine to operate on either a dial-up or TWX network. The auto-answer unit will handle a message on either service and "busy out" the unused circuit, a spokesman explained.

When used in conjunction with two Bell CBT Data Access Arrangements, the modification, which fits directly into the Model 33, allows dual service from one terminal instead of two TTYs from the phone company, the spokesman said. The complete Model 33 with either rotary or Touch-Tone dialer costs about $1,585.

Com-Data also showed a self-installed acoustic coupler kit for the Texas Instrument Series 733 portable terminal. Installed with a screwdriver, the kit costs $175 compared with $395 for a similar coupler unit from TI, according to a Com-Data source.

Datapoint Corp.'s Hasp Workstation

'Management Gap' Can Be Bridged, Keynoter Asserts

By Edith Holmes
Of the CW Staff

NEW YORK – Information produced for management must be both timely and actionable if "the management gap" between top executives and systems people is to be closed, Peter G. Scotese, president of Spring Mills, Inc. of New York, told the opening session of the American Management Associations' Info '74 here last week.

Management holds the responsibility for telling its information people "what kinds of data *are* timely and actionable," the keynote speaker told his audience of 250.

"Then it is up to the information people to produce it, in acceptable form and within acceptable economic constraints," he added.

Scotese asserted effective management of information systems depends upon this kind of communication between the data processing function of an organization and its users.

But these lines of communication are often nonexistent or are obscured by other concerns. He suggested that management must think about the various "audiences" affecting DP performance.

Perhaps first among those impacting DP activity are the hardware and software suppliers, Scotese said. Characterizing such suppliers as "the highly effective salesmen whose stock in trade is frequently overkill," he emphasized the need for management to be able to "separate fact from hyperboie."

CW at Info

Programmers and systems analysts form another group of people whose capabilities determine the efficiency of information systems, according to Scotese. The responsibility for harnessing the creativity of these people, whose interests may tend more toward increasing the level of DP sophistication than making programs timely and actionable, must fall to the DP manager in an organization as well.

While the controller-treasurer-accountant group may look upon the DP department as a "supercalculator," Scotese remarked, its need for "fast numbers" enormously complicates the records and documentation task of a systems group.

The fourth audience – the various operating divisions and staff areas of a company – provides the DP department with perhaps its "most persistent problems of communications and mutual suspicion," he said.

Because each division and department has its own information needs and because these must be handled largely on an individual basis, the challenge to DP management, in Scotese's view, is to make "everyone in the organization feel that the DP service is *his* service."

"Systems people must understand the business, the objectives and the organizational structure of each division," he continued. They can also be expected to be "hard-nosed and objective in evaluating information systems."

Those in DP must "determine the feasibility and payback before developing a system and should continually challenge existing systems," he added, suggesting that their ability to do this provides top management with a means of evaluating their performance.

The final audience, corporate management, acts as both evaluator and user of its business DP capability, Scotese said. And top management must learn to evaluate "this tool on how well it serves all its audiences, not just one.

Three Ways Available For Presenting COM As Legal Evidence

By Toni Wiseman
Of the CW Staff

NEW YORK – As many users caught between the "paper explosion" and the "paper crisis" turn to computer-output-microfilm (COM), the problem of COM's evidentiary status in court arises more and more frequently.

In a micrographics session at Info '74 here, users learned what particular stipulations they must meet in order to present COM as evidence in legal action.

There are three bases for admitting microfilm as evidence in court in lieu of an original document, according to Robert Williams, president, Cohasset Associates, inc. These include the Uniform Photocopies Act, the Best Evidence Rule or Common Law and the Best Records Exception to Hearsay Rule.

The Uniform Photocopies Act, Williams said, states that if any business, in the regular course of business, has had any or all accounts filmed, the originals may be destroyed, unless their preservation is decreed by law.

The microfilm is then admissable in court in the place of the original, whether or not the original is in existence.

However, he cautioned, the law must be followed specifically. For instance, the phrase "in the course of business" means a firm cannot microfilm documents simply because it is going to court; it must be the specific corporate policy to microfilm all such documents at all times.

The law also states that microfilm will be admissable when such reproduction is "satisfactorily identified."

Williams proposed that firms considering microfilming include, at the beginning and end of each tape, a statement by the operator testifying as to the completeness of the file.

Another point to keep in mind, particularly if using microjackets or microfiche, is that these techniques require that the film be cut or manipulated. This, he said, leaves the firm open to the charge that some data has been moved or tampered with. This charge can be avoided if two films are made, and one kept in roll form.

The Best Evidence Rule allows microfilm as evidence if the original document has been lost or destroyed, if it is in the possession of a third party who cannot be subpoenaed by the court, if an adversary failed to produce the original when notified or if the document is public record and therefore not available for presentation in court.

Finally, Williams explained, the Best Records Exception to Hearsay Rule provides that a record shall be admitted as evidence if the presenter testifies to its identity, the mode of its preparation, that it was made in the course of business and was made near the time of the account.

This rule is particularly applicable in the case where there is no original document as such, as in the case of a bank where the source document, a check, is actually only passing through the organization and not retained, he noted.

Reliability the 'Stumbling Block' To Wider DP Applications Usage

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – System reliability is still a major "stumbling block" in advancing the progress of computer usage. Many applications cannot be run today simply because computer systems are not reliable enough, according to William Davidow, manager of microcomputer systems at Intel Corp.

Reliability problems have been significant in telecommunications, point-of-sale, hotel and banking applications, Davidow told a keynote session at Compcon '74

CW at Compcon

here last week. These applications will require systems with a reliability "10 to 100 times greater than that available today," he predicted.

But this required reliability will be achieved soon. Advances in LSI technology will make low-cost redundant systems economically feasible, he told the attendees.

Powerful Savings

One of the greatest areas of advancement has been in the power consumption of the newer devices, Davidow said. A typical vacuum tube flip-flop circuit in the past used to consume about 5 W of power. But today, integrated circuit equivalents of the same function dissipate less than 50 mW. And high-speed bipolar RAMs today consume only .5 mW/day, he said.

Productivity has been increased in programming with the advent of the assembler and the compiler; but even with these improvements many people are surprised to learn that the average programmer today "produces on the order of 10 to 20 debugged and documented instructions per day," Davidow said. Without the major software improvements, the average programmer would be producing less than one instruction per day.

For most businesses the cost of operating a DP installation runs between 1.5% and 2.5% of sales. And the expenses of running this installation are distributed equally with about one third allocated to hardware, one third to operations and one third for program development.

The development of the microcomputer since it was first introduced in 1971 has reduced the cost of computation in the areas of power consumption, system reliability and speed. The latest improvement in speed occurred within the last few weeks with the introduction of a bipolar microprocessor, he said. (See story on Page 33.)

Another direct relationship between the micros and the cost of operation has occurred because the design engineer has "swallowed his pride" and accepted *de facto* microcomputer standards. Because he has accepted basic processors designed by others, the engineer is free to concentrate on other problems, thus the cost of hardware development is lower, Davidow implied.

This standardization has created an applications gap. The need has developed not for circuit design engineers but instead for those who apply the micros to solve practical problems. What is needed are experts who can expand the programmable logic technology to end-user applications.

One of the end results of these advances may be that users will forsake sending written messages for the telecommunications offered by CRTs. A 13 cent airmail stamp put on a one cent paper enclosed in a two cent envelope is rapidly becoming less cost-effective than a message transmitted across the country at 1,200 bit/sec for delivery the next morning, Davidow suggested.

'Eastern Experiment' Deemed Successful

WASHINGTON, D.C. – Compcon's experimental journey to the East Coast may well become a yearly event, according to preliminary evaluations.

The conference sponsored by the IEEE Computer Society in Washington last week marked the first time dual Compcons, one on each coast, have been held the same year.

"There is a 99% probability that this will become a twice-a-year show with annual Fall sessions in Washington," Rex Rice said. Rice, chairman of the Compcon standing committee, said the attendance goal of 700 had been exceeded with more than 800 registered for the three-day event.

As might be expected, most of the attendees at the 26 technical sessions were IEEE members, but Rice said the Association for Computing Machinery was also well represented.

Hardware designers outnumbered software specialists by about two to one, Rice thought, adding there is a definite Compcon trend toward more practically-oriented applications sessions.

Rather than reflecting a deliberate goal of the conference committee, the more practical technical sessions were a response to the type of papers that are being submitted for the Compcon conferences, Rice said. Since systems designers can now buy basic circuits in IC form, they are able to devote more attention to the applications needs of the user.

Reinforcing the trend toward more user-oriented sessions, the computer society issued a call for papers for the next Compcon, scheduled for February in San Francisco. Based on the theme "Computer Technology To Reach People," the next conference will stress such user applications as retailing, banking, education, transportation and health care from both the hardware and software sides.

General chairman for the Spring Compcon '75 conference is Lowell Amdahl, president of Compata, Inc., Woodland Hills, Calif. 91364.

Transaction-Based Mini Popular With Novice User

WASHINGTON, D.C. – There has recently been a sharp growth in the use of transaction-oriented minicomputer-based systems in business applications. This growth can be attributed to falling prices, more disk availability and applications software said Dr. George O. Gardner of Arthur D. Little, Inc.

Most of these systems operate in an interactive mode with between one and four terminals. They are installed by firms that used accounting machines in the past and the system typically is used by a clerk who previously spent the majority of the time with financial applications posting ledgers. The process associated with the distribution of a product is also a typical application for these types of mini-based systems, Gardner said.

Since this type of user has no DP staff, it is very difficult for him to evaluate a mini-based system. There is invariably a comparison with earlier manual systems where a hard-copy record was generated and the user is skeptical about having to do away with the ledger in favor of disk records, Gardner told a Compcon '74 session on the business applications of mini/micro computers.

Because these users look for total systems support on both the hardware and software level, they are usually hesitant to stray into mixed vendor environments. This means the system supplier must provide the user with a complete turnkey system, Gardner said. "They want to interact with one supplier that allegedly knows their business."

Another type of user for these systems is the branch office of a larger company. In this case, the branch may have the same local problems as the small business but in addition, the branch usually is bound to follow the DP procedures established by the parent company which operates a central mainframe site.

For most of these business-oriented systems, a large amount of software is required because the procedures have exceptions for everything. And even though order entry and inventory control sound simple, it is not unusual to see huge amounts of code written for these systems, Gardner said.

One way to get around these exceptions is for the user to dedicate a specific terminal to each procedure, he suggested. However, a disadvantage of this approach is that the dedicated terminal may be utilized only a small portion of the time depending on how often its assigned task is required in the course of the business day.

Most of the branch office systems use operating systems supplied by the vendor. In many cases, this software is a spinoff from an earlier process control operating system and may not be suited for the business usage, Gardner told the attendees.

The majority of the mini-based systems operate in stand-alone mode or at most they transmit or receive a limited amount of data for short periods each day.

One trend is the emergence of the multi-mini interactive business system. The minis talk to other similar systems through a central mainframe at a firm's DP site with total data maintained at the mainframe. But detailed information for each branch office is maintained on the local mini system, Gardner said.

'Want to See My Sixth-Generation Computer?'

Editorials

Potential 'Catastrophe'

Few states seem to have initiated any type of security system to safeguard their computer processing activities and a report published recently by the National Association of State Information Systems (Nasis) revealed just how lacking most states' security and privacy practices are.

Of 42 states that replied to survey questions on security and privacy systems, only 20 said they had implemented even a plan to protect their installations against physical attack or damage.

Only nine said they audited their systems. Eighteen have no auditing plans.

Only 15 states require even a simple ID badge for those who enter the DP center.

As for data security, 12 states said they have issued a data security plan. Twenty-five have not. Of the states with "a plan," only nine have been implemented and only six include an audit.

While 24 states reported increasing public concern over the issues of confidentiality and privacy of computerized data, public concern appears to have been largely overlooked by their elected officials. Only 14 states reported legislation in effect, and in each case, statutes were only "partial."

Two states considered their legislation "sufficient."

Not a single public conference has been held to discuss privacy and security legislation in as many as 23 states. In 17, no legislative action has been initiated, and 19 reported no action by their governors.

Nasis has been deeply involved in developing security standards and model legislation to limit access to data in governmental files. Its ideas, it would seem, could be used to great advantage by those states which haven't taken their own first steps.

State officials owe it to themselves and their constituents to head the warnings of their DP employees' professional association that poor security threatens a "catastrophe of great magnitude" to state governments.

EFTS Stampede

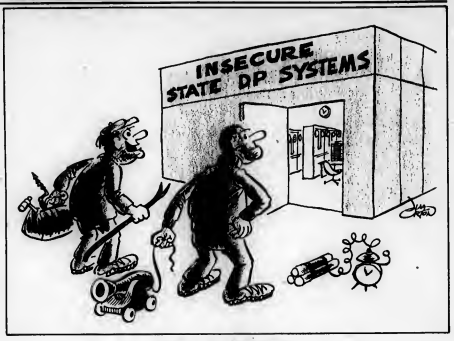
Proceed with caution in the move to electronic funds transfer systems (EFTS), Canadian bankers were advised recently by an executive of the Royal Bank of Canada.

That warning applies doubly to the fragmented U.S. banking industry, which is suddenly feeling stiff competitive pressure from innovative savings and loan outfits to jump into the electronic money game.

The embryonic movement toward EFTS will eventually mean great changes in government regulation of banking, banking standards and the financial power structure. It will also raise new and bigger problems of security and individual privacy.

The main reason for EFTS will be to save money in the back rooms of the banking system, where the flood of paper is still swelling fast. Meanwhile, the checking account system continues to serve remarkably well. Most consumers are satisfied with it.

There's no reason for a competitive stampede toward the "checkless, cashless" society. It's coming, but the transition has got to be slow, orderly and broadly planned before individual banks begin installing unilaterally developed systems.



'Chee — It's Wide Open!'

Letters to the Editor

Certification Critics Challenged To Help in Improving Profession

Apparently, Al Smith [CW, Sept. 4], is not aware that the Certificate in Data Processing (CDP) not only carries with it a Code of Ethics but an extension of this Code of Ethics. The extension covers two additional areas, "Code of Conduct" and "Code of Good Practice." The extension was approved by the CDP Certification Council in April 1973.

The Codes of Conduct and Good Practices for CDP holders describe:

"The essential elements relative to conduct that identify a professional activity are:

- A high standard of skill and knowledge.
- A confidential relationship with people served.
- Public reliance upon standards of conduct and established practice.
- The observance of an ethical code."

In addition to the essential elements approved by the Certification Council, I feel that to be professionals, the following are required:

- Degree of learning – This requires a specified level of learning that can be covered by training, experience and testing. The CDP program provides the basis for this degree of learning.
- Standards – This area covers both technical standards and professional standards. The professional standards are also covered by the CDP program.
- Licensing – This third requirement is being pursued in at least one state and maybe others. This is not the final step to professionalism, but is a most important one to obtain recognition by the public, management and fellow DP practitioners.

Smith suggested that certification be abandoned. I disagree and challenge Smith and any one else who agrees with him, to sit for the CDP exam next February, to join other DP professionals and the CDP holders in advancing the data processing profession and in providing the public with a new attitude toward data processing.

Harold L. Estes

Clearwater, Fla.

Tests Don't Consider 'Little Guy'

Each week I read *Computerworld* and follow the pros and cons of certification. And it seems to me that one point has never been brought up.

I am the DP manager for a small firm which has a tape system. I keep current with all the hardware and software advances but do not have an inherent knowledge of all these changes.

I concentrate solely on my company's needs and improve the system as I gain more experience through time and effort. As our computer system expands, I implement new techniques even though they may have been around for four or five years.

In looking over certification booklets, I find half of what the tests are based on I have no need for because of the size of our business and computer, but this should not classify me as an inexperienced DP manager.

Some consideration should be made for the little guy.

Fred Twepesta

The Greene-Shaw Co., Inc.
Newton, Mass.

Remote Main' ~ance Good for User

Re "Remote Maintenance: Trend of Future?" in the Aug. 21 issue:

I heartily disagree with Ronald A. Frank's prognosis of the implication of remote maintenance.

Compare for yourself:

Problem occurs.
Call service.
Thirty second machine to machine.
Pause.
Arrival of parts and installation.

or

Problem occurs.
Call service dispatch.
Pause.
Confirmation call from engineer.
Pause.
Arrival of engineer and diagnosis.
Pause.
Arrival of parts and installation.

I concede that this progressive step creates some problems for non-IBM hardware vendors, but I do not accept Frank's sweeping conclusion of doom to these parties. I believe a more reasonable conclusion would be that IBM recognizes the difficulties involved in remote testing of its many multivendor customers.

Furthermore, I expect any unilateral move by IBM which would downgrade service to multivendor shops would be actionable by both the user and the non-IBM vendor.

Frank goes on to say that the user will have "less information about his system." I submit users will have vastly *more* practical information about their systems, substantially less downtime, and may even find maintenance costs reduced.

Robert R. Miles

Arlington, Va.

He's Not Buying Anything

The irresponsibility of Herb Grosch's July 3 column entitled "The Honeywell Mess" and *Computerworld*'s response to criticism for having published it, as expressed Aug. 21, is inexcusable.

I have decided to decline renewal of my subscription.

Raymond S. Gould
Corporate Director
Systems & Data Processing

Tecumseh Products Co.
Tecumseh, Mich.

Programmers as Easy to Lose as Needle in Haystack

By Paul Torell
Special to Computerworld

Remember the song "100 Easy Ways" describing how women lose men? After conducting programmer job searches for scores of companies, we have found there are almost as many ways to lose programmers.

It would seem that if programmers are the most sought after specialists in the work force, one might expect conscientious data processing and programming managers to strive to hold onto those they already have. This, however, is often not the case.

Because of the frequency of "revolving door" situations, one must conclude they occur by plan. Therefore, to assist those managers who are seeking to increase mobility and turnover, we have researched and identified the twelve major proven causes of programmer discontent.

They are as follows:

1. Allow programmers who have quit to just walk out of the office without an exit interview. Do not attempt to find out why they are leaving. Do not maintain records on exiting employees. Do not ask them what they dislike or like about the operation or why they think the ones they are going to are better.

2. Be oblivious to staff behavioral changes. For example, when a programmer who has generally offered alternative ways that you have disregarded ceases to make any further suggestions, do not assume he no longer cares about the job because he has lined up another one.

3. Assume a posture about mere money. Do not concern yourself with decreases in bonuses or profit sharing. If a programmer does gripe there, say he's lucky to get his salary. Exude a philosophy that each programmer should do his best regardless of salary, automatically, just the way a machine does.

No Praise

4. Single programmers out for negative comments only. Do not praise privately or in front of others. A programmer in whose work you have shown a positive interest will be more difficult for someone else to replace.

5. Place the entire staff in lock-step in terms of salaries. Fight merit increases. Be as parsimonious with money as you are with praise. Remember, money speaks louder than words; act accordingly.

6. Preserve status quo in terms of equipment. Avoid upgrading hardware for as long as possible, even when you are forced to by powers beyond your control, prevent members of your staff from learning of the advent of new equipment until the last possible moment.

7. Provide total staff with full access to personal phones. Make no effort to monitor or screen incoming calls even by just having a telephone receptionist ask, "Whom may I say is calling?" To further assist recruiters, publish and widely disseminate lists of employees giving their departments, extensions, job titles and home addresses.

Viewpoint

Be Insensitive

8. In what had been all or predominantly male departments, do not alter the physical environment or your behavior in any way to adjust to the sensibilities of women programmers. Continue to display in prominent locations those calendar nudes you get from the traffic department. Maintain old-time pool hall atmosphere, including spitoons, if possible, and smutty jokes.

9. Keep the programming staff space as it was when used by accounting. Discourage partitions, walls or other changes which might offer privacy. Stress a communal approach and cross conversations. See if desks can be used by more than one shift. Encourage second and third shift operators to use programming space as backup lunch or snack room.

10. Always be impartial. If a programmer has completed a job, make no special efforts to have it run promptly. Try not to let the programmer know when work will run. He might be able to accelerate the debugging process. Do not give the programmer any additional tasks while he is waiting. It might take his mind off the program and alleviate his anxiety.

11. Keep staff operating well below capabilities. Take special pains, for example, to put a BAL programmer on Cobol assignment. Prevent a programmer with a unique skill in great demand elsewhere from applying that skill in your shop.

12. Stand fast in the face of innovation. Refuse to discuss job security. Say contracts are unthinkable. Take no actions to protect their jobs when that new manager takes over from you on your well merited promotion.

Paul Torell was a programming and systems manager before opting for the personnel business with Douglas Personnel Hackensack, N.J.

The Availability Problem:

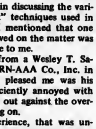
Some weeks ago, in discussing the various "Bait and Wait" techniques used in selling computers, I mentioned that one of the letters I received on the matter was particularly welcome to me.

The letter came from a Wesley T. Saville, president of RN-AAA Co., Inc. in Chicago, and what pleased me was his saying he was sufficiently overwhelmed with everything to speak out against the overselling that was going on.

And, in my experience, that was unusual.

I have many letters from people who are annoyed at various aspects of the DP profession, but almost without exception the writers call upon me to speak out – while they themselves stay quiet!

The Taylor Report
By
Alan Taylor, CDP



Frankly, I would like to use my efforts to deal with constructive matters, rather than to complain about shoddy practices. So if Saville and others are going to speak out, it will allow me to get off the soap-box to some extent, which will be welcome.

Many other readers wrote in confirming that they had experienced successful underselling (see box) and said they felt it was somewhere unprofessional and criminal. Saville, however, took time out to develop another subject: the availability problem.

100% Uptime Expected

To quote him: "When a user rents or buys a system he should be able to expect 100% performance of the total system most of the time; 95% plus is a good starting point for 100% uptime of the total system.

"However, when a card reader is down and the user is running card-oriented jobs on only one of his two card readers, the total system is usually out of time. This gives the user only a portion of his purchased 100% performance.

"Despite this, the manufacturers do not consider the system down – just the particular equipment. (The same goes for printers, mass storage devices and system support software, of course.)"

Saville has a point. I like his equating systems support software with standard peripherals. A breakdown in systems software does have the same effect as a breakdown in the hardware as far as obtaining use from the system.

His point is one which even some of the manufacturers have been beginning to accept over the years, bringing in terms like "availability" to their contracts rather than simply listing units of hardware which will be temporarily present.

Use or Time?

The real point, however, lies in the valuation of nonavailable use as opposed to nonavailable time. If the hardware or software causes a loss of use which is much larger than the rate at rental rates of the equipment that is down, the additional loss currently falls upon the user – although it may be totally outside his control.

This is hard.

Yet the opposite side of the coin is hard also. If a card reader is used to bring in some vital operation, such as the status of a chemical reaction, and during a short breakdown the reaction goes out of control and blows up a plant, then – even though the damage has occurred as a result of the card reader breakdown – the real cause of the loss was trusting the equipment with an unreasonably large responsibility.

I don't see how a financial set-up would work under which the vendors would have to make up such losses, and yet I do see Saville's point. It would just try to avoid stating the problem in terms of actual losses and try to state it in terms of rental.

Looking at his description it appears that this may be possible. He talks about a system lamed by the loss of one of two card readers and objects to that loss being valued in terms of the reader rental, when in fact it is crippling much of the system. He does not comment on any other way of working out the losses, although there are some available.

It could be said for instance, that a system with half its card input down is 50% crippled, so credit for excessive downtime should be 50% of the system, rather than 100% of a card reader.

In some uses, however, this would not be adequate. The loss of a single card reader might reduce the system to inoperativeness. What is adequate in one situation for one user is simply not adequate for all other users of the same equipment; what one person needs, another person can program his way around.

Who Pays for Downtime?

Which brings up the question of whether all users should have the same contracts, the same costs, the same rights, etc., when they use the same equipment.

Or should contracts for computer equipment – if they are to be regarded as being operative systems rather than collections of hardware – be individually negotiated and the cost of maintaining the required system availability be charged depending upon the risks involved?

In short, is our system of standard contracts inconsistent with the uses to which our general-purpose computers are being put?

What do you think? Do you agree with Saville's first point – that the current credit terms in the standard computer contracts are simply inadequate to cover the needs of system users? Do you have any suggestions as to what might be really practical ways to provide realistic terms? What would such terms be?

Are you prepared, like Saville, to speak out on these subjects? If you are, please write to Saville or myself (c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160) and let us know what your ideas are.

Underselling that I've seen can best be categorized as quoting an inadequate configuration tactic, which is successful through the use of 'Bait and Wait' techniques, as mentioned in earlier Taylor Reports' A. Judson Farley, consultant, Spring Valley, N.Y.

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Inadequate testing and poor performance are the hallmarks of underselling tactics I have met and which have been successful. I think that they are fraudulent practices. Jerry Campbell, chief of operations, San Francisco.

– – –

I've met systems proposed with insufficient capacity to operate efficiently. The system was operable, but with much operator manipulation. Myron Lentz, DP manager, Pittsburgh.

– – –

,[Underselling is] offering a solution for a certain price which vendor knows is too low to provide equipment, etc., that customer really needs. Eugene Rosoto, DP manager, Berkeley, Calif.

– – –

I've met successful underselling carried out by the vendor overstating what the hardware can do, which falls into the category of underselling by poorer performance than represented. Don Alcott, DP manager, St. Louis, Mo.

– – –

I've met underselling by poor performance after an independent manufacturer successfully claimed that a memory unit would perform more accurately than the equivalent IBM unit. R.W. Bridge, district DP manager, Port Huron, Mich.

– – –

A 'local maintenance facility' for independent disk drives with adequate parts turned out to be a local answering service that paged repairmen to respond from 50 to 60 miles away. James J. Cronin, DP manager, Pater Kuntz Co.

– – –

Underselling turned out to be the opposite side of the coin of overselling when readers responded to a question on whether they had met underselling tactics recently. And they had little doubt on whether it was the user's or the vendor's fault. Some of the typical comments received are printed above.

Structured Programming the New 'Universal Elixir'?

By Miles Benson
Special to Computerworld

You've all heard of structured programming, right?

It's the new approach to design and programming that gives a more effective design, speeds coding, drastically reduces checkout time, supports Motherhood and Apple Pie and leaps tall buildings in a single bound.

In short, it's computing's Universal Elixir, circa 1974.

Once you discover an elixir, can an elixir salesman be far behind? I hate to answer my own question. I hate the answer even more. But the answer is positive. Elixir salesmen abound.

Remember back, if you're a computing "old-timer" (30 or older), to when computing was an exciting new field which exploded into prominence? That rapidly rolling stone seemed to move too fast to attract the moss of those more interested in money than quality products. Oh, there were a few stock manipulators and paper product touts. But mostly, there were people who found the field satisfying enough that doing a technical job well was a goal in itself.

But beware. As the rolling stone slows into stability, the profits-over-professionalism crew are moving into the field.

I'd like to illustrate what I mean by a story about structured programming.

Acme Chemical Co. (a pseudonym) has a strong computing department. Its applications range from process control of some pretty exotic equipment to accounting for fertilizer sales. If there's a way to improve the programming process, Acme would like to know about it. Lots of bucks in lots of departments are at stake.

The Universal Elixir hit Acme like it hit everyone else. Who can turn down "cheaper and better"? Structured programming, the computing folks at Acme decided, needed to be investigated.

There are lots of ways to look at a new technique. Acme chose a straightforward, conservative approach. It chose a team of

The Project That Failed

reasonably innovative programmers to implement a standard business system using a structured programming approach – as an experiment.

The Acme structured programming team studied the literature, studied the problem area, studied the languages available. The language which was most suitable for the application lacked the block structure capability structured programming demands, so they defined some revisions to the language and built a translator to convert from the structure-augmented language to the base language.

So far, Acme's approach to getting aboard structured programming is impeccable. Understand the problem. Define the experiment. Build the tools. Use them.

Enter Complication

However, there is a complication in the story. The complication is Acme Learning Institute (ALI), a subsidiary of Acme Chemical, which offers courses in technical areas both inside and outside the mother company.

ALI has been getting strong vibes from its customers out yonder that a course in structured programming would be the greatest thing since its advanced winemaking techniques lab. Only the people wanting structured programming are big businesses (well, some of them are middle-sized) with lots of money.

Picture the dilemma for Acme. Its only skills in structured programming are experimental. And the people with those budding skills, of all people, are the only ones in Acme with enough background to even consider teaching a course in structured programming.

That's the practical dilemma.

Then there's the moral dilemma.

Should a company – in fact, should people – which doesn't know anything conclusive about a subject teach it?

The moral answer is a resounding "No."

But ALI didn't take "No" for an answer. Like the elixir salesmen of yore, ALI moved ahead with plans to offer the course. Strictly on the basis of demand. With no thought for instructional quality.

I have a term for the ALI folk who made that decision. Institutionalized Charlatans. They're elixir salesmen, but with rented hotel suites instead of wagon-based tent shows, with clean shirts and shined shoes instead of frayed collars and dusty suit coats.

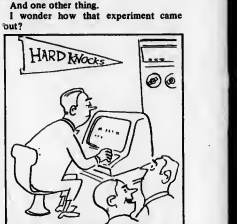
ALI included the course in its catalog last spring. It's already taught a few sections of it, with the help of some reluctant Acme computer types who couldn't say "No" when the chips were down either.

I've called this story a project that failed. Actually, that's more of a prediction than a statement of fact. For all I know, ALI is turning out a bunch of satisfied students who feel they got their structured programming money's worth. Knowing the people doing the teaching, I believe they're getting the basic facts about the subject, with some good interpretations to fill in the gaps.

But they're not getting the benefits of experience.

And one other thing.

I wonder how that experiment came out?



'And He's Made the Most of His Schooling'

Open Door at CPE Summit Meeting

By Don Leavitt
Of the CW Staff

MONTREAL — Users interested in finding out what computer performance evaluation (CPE) involves, how it might benefit their organizations and what others are doing in the area, have an opportunity to get answers here later this month. Two organizations — The Boole & Babbage Users Group (BBUG) and the Association for Computing Machinery's (ACM) Sigmetrics — have scheduled three days of concurrent sessions and one joint meeting at the Sheraton-Mt. Royal Hotel, starting Sept. 30.

Officials of each group stressed that the sessions are open to any people interested enough to attend, regardless of whether they are formally members of either sponsoring group.

The result of all this planning: discussions of practical experience and theoretical concepts in CPE, in proportions as varied as the listener wishes, and, at the BBUG meeting, the initial presentation of what is expected to be an annual award "to an individual judged to have made significant contributions to computer metrics."

This year's recipient of the A.A. Michelson Award (named for the U.S. physicist who won the Nobel prize in 1907) will not be announced until the meeting, a BBUG spokesman said.

The history of the two groups explains the differences in their agendas, observers explained. BBUG was organized by Boole & Babbage for users of its products, but the group went independent in 1972. It still has strong psychological ties with the vendor and a basic bias toward "real life" problems in the business DP community.

Sigmetrics, spawned by ACMers interested in measurement and evaluation, follows, a more theoretical bent in its considerations, looking to the future for solutions.

But the lines do get blurred. Sigmetrics said in its acceptance of "approximately 22 papers" for presentation, it will provide "a balanced and integrated mixture of theoretical and pragmatic topics."

Preliminary plans call for Sigmetric sessions on program behavior, virtual memory systems, processor allocation models, instrumentation techniques, interpreting measurements, scheduling and control.

The BBUG schedule includes sessions on such topics as "Tuning the System, a Two-Level Approach," "To VS or Not to VS, a Measurement Decision" and "How We Went From Two 370/155s to Two 370/155s."

The joint meeting will feature three hardware monitor vendors who have been invited to make presentations. Along with Comress, Inc. and Tendata Systems Corp. from the U.S. will be Computer Performance Instrumentation from Kitchener, Ont.

Basic registration fee for each of the conferences is $75, although Sigmetrics charges an extra $10 for nonmembers.

Handling registrations for Sigmetrics is Dr. J.W. Atwood, Department of Computer Science at Sir George Williams University. Comparable chores for BBUG are being managed by Fernand R. Belley, Hydro Quebec. Both the university and the utility are located here in Montreal.

Directory Lists Government Data Bases, Support

SPRINGFIELD, Va. — Researchers, forecasters and analysts can learn what information is available from the Federal Government in machine-readable form and where it can be found, with the *1974 Directory of Computerized Data Files and Related Software* from the National Technical Information Service (NTIS).

The directory is described by NTIS as a guide to "more than 500 data files" arranged by subject. Many of the tapes listed are available through NTIS, and directory users are also eligible for free mail or telephone reference services from NTIS' Computer Products Office.

The files in the directory range from demographic data from the Census Bureau, through vital statistics produced by the National Institutes of Health and comparative international statistics from the Bureau of International Commerce.

Other sources cited include the Departments of Agriculture, Labor, Defense, Interior, Justice and Transportation. Agencies such as the Internal Revenue Service, Environmental Protection Agency, Smithsonian Institute, International Monetary Fund and National Science Foundation are also represented, NTIS said.

Users who hope to glean detailed information about individuals or reporting units from the cataloged files will be out of luck, a spokesman added. Release of information is "tightly controlled" by the confidentiality rules of the various agencies and the data files are offered in summary form only.

The initial announcement of the directory did not define what was included in the "related software," but the term probably covers retrieval and report writer programs required by specially formatted data files and data bases.

Copies of the directory, identified formally as NTIS-SR-74-01, are available for $60 each, which, an NTIS source claimed, can be tax-deducted as a business expense.

The mailing address for NTIS, which is part of the Department of Commerce, is Springfield, Va. 20230.

Package Backs Dynamic Debugging of CICS

BAYSIDE, N.Y. — Cobol and BAL programmers working under IBM's Customer Information Control System (CICS) can dynamically insert conditional test and program change instructions into ongoing programs, with the Advanced Debugging System (ADS) from Gary Bergman Associates, Inc. (GBA).

The debugging package provides keyword/command language through which users can inquire against and alter any part of the CICS software, including temporary storage and file records.

ADS can monitor the processing path of any transaction, GBA said, to detect and prevent system errors caused by illegal free main storage addresses, invalid I/O areas for PUT or RELEASE commands or storage references outside of task-related areas.

ADS provides for entering nested IF, THEN and ELSE logic based on a variety of conditional statements that can compare storage locations, addresses and data literals. ADS "source statements" can be inserted directly into an existing load module without converting them to machine code as required by many patching procedures, GBA noted.

ADS requests can be entered at will through any authorized terminal or the requests can be stored in advance of the test run to be brought into play whenever the program being debugged reaches a specified storage location, GBA said.

Repairs

The inserted statements can be invoked by all tasks to effect emergency repairs or be linked to a specified terminal for test purposes without affecting the processing of production tasks.

When ADS detects an error, the offending task is suspended before damage occurs and is routed to a terminal for manual inquiry and further debugging. An interrupted task can be resumed until a given set of conditions is satisfied, thus pinpointing when changes in registers or data fields take place, the vendor said.

Requiring no more than 7K of storage plus I/O areas, ADS is available for a one-time charge of $8,900 or $500/mo. Rental charges are waived after 24 months, the company noted from 19-22 202 St., 11360.

Net Expands APL.SV, Adapts It to Run on 360

VAN NUYS, Calif. — Subscribers to the Proprietary Computer Systems (PCS) remote computing network can transfer information between interactive APL programs and batch-based programs in other languages, with a PCS-developed enhancement to IBM's "shared variable" APL release.

The same enhancement package, now capable of running in 360 as well as 370 environments, can be leased from PCS from large-scale in-house installations, the vendor said.

APL.SV originally became available from IBM in May 1973 on a programming request for price quotation basis. Designed to support data swapping under an originator-authorized user arrangement, it included 370-type instructions which mocked its use on older IBM equipment.

The PCS version of APL.SV includes all standard IBM releases, the vendor said, plus a number of modifications PCS had developed for use with earlier APL releases. These include a shared file system, "picture" formatting of output, high-speed character manipulation and automatic tabsetting, a spokesman said.

Error trapping facilities, remote job entry, CRT terminal support and a large public library of applications programs are also in the PCS packaging. APL workspaces can be expanded beyond the 32K bytes that once was "standard," he added.

The enhanced APL.SV is available on the PCS net with charges based on resources used. The in-house package can operate in a 256K 360/50 under OS/360 but would be more "comfortable" in 512K, PCS said.

The language processor can be leased from PCS for "about $2,000/mo," and the library can be added for a like amount. Users would also need IBM's APL program package to make the system operational, the PCS source noted from 16625 Saticoy St., 91406.

Datapoint 2200 Runs Text Work

NEW YORK – Datapoint terminal users in stand-alone mode should be able to run text editing functions with the Cytex-5 software just introduced by Base, Inc. The package allows the user to generate, edit and store large documents with semi-skilled operators.

Originally developed by Ebasco Services, inc. for internal use in the typing and editing of engineering and government specifications related to building nuclear power plants, this system has now replaced Ebasco's conventional typing pool and MTST operations, according to Base.

Working with the typewriter-style keyboards of Datapoint 2200-II or 1100 terminals, clerks enter textual material, mathematical equations or tabular data as they might on "normal" office machines.

As they are entered, the meterials are displayed on the unit's CRT screen and recorded – with generated page and line numbers – on a magnetic tape cassette. When the user is ready, the cassette is moved to a printer station (Datapoint "terminal" and Diablo printer) to generate a hard copy of the text.

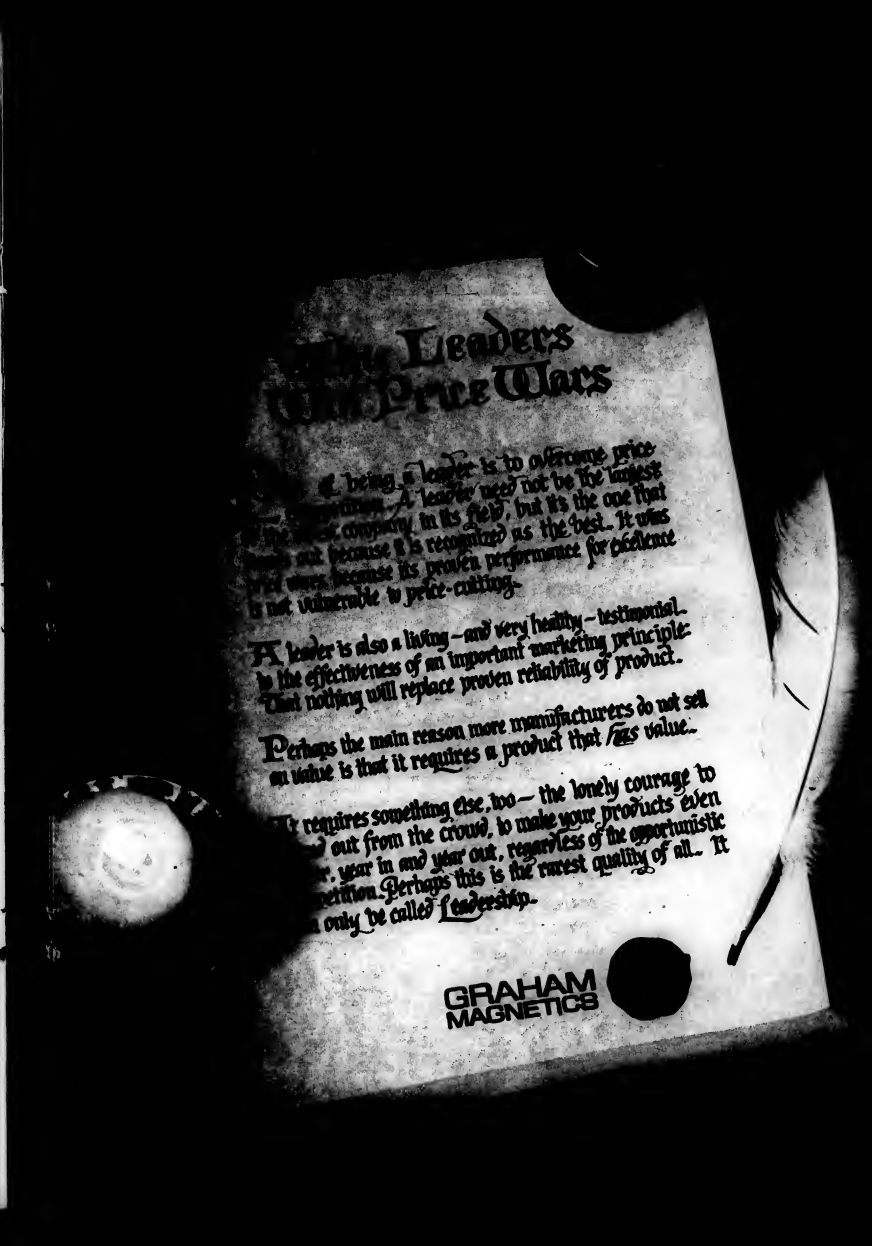
For editing work, the operator moves the cassette to a work station and keys in the number of the line requiring attention; the system retrieves and displays that line.

No command language is required, Base stressed. The system is designed to prompt the operator who answers the displayed "what do you want to do next?" style questions with English answers.

Editing under Cytex-5 is said to be easier than under IBM's Administration Terminal System (ATS) since line numbers are fixed for the life of any edit run. Revisions can be planned in detail as soon as the first part of the user's hard copy comes from the print station.

Under ATS, line numbers are immediately altered as soon as a line is added or deleted. This meant, users discovered, that corrections had to be planned – and executed – from back to front, and the entire process had to be delayed until the last part of a draft was printed.

Cytex-5 can be used on any Datapoint 2200-II or 1100 with 8K of memory. Although Base can install the editing system on a turnkey basis, the software is available separately for current Datapoint users for "about $100/mo" per station. The firm is at 437 Madison Ave., 10022.


Leaders
Price Wars
GRAHAM
MAGNETICS

Program Checks Tape Surfaces

CLIFTON, N.J. – IBM 360-370 users can check the writing surface of scratch tapes and the data recorded on active files with the Fast Analysis of Tape Surfaces (Fats) package from Innovation Data Processing, Inc.

The test functions can be performed independently and concurrently, and the utility can handle up to nine tests at a time, all at tape speed, the company said. The tests are run on the user's normal tape drives and can be used with 7- or 9-channel tapes including the recently announced 6,250 bit/in. recording densities.

Most IBM-compatible tape drives and independent tape reels can be used by Fats.

Fats uses a unique character set to certify new or old scratch tapes. With this character set, Fats can in most cases detect one- and two-bit recovery, insuring complete identification of problem tapes, Innovation claimed.

For new tapes, a standard label can be written by Fats prior to certification of the surface. Fats can also be used to label tapes bypassing the certification process altogether. The standard label will be preserved, where specified, when certifying old scratch tapes, a spokesman added.

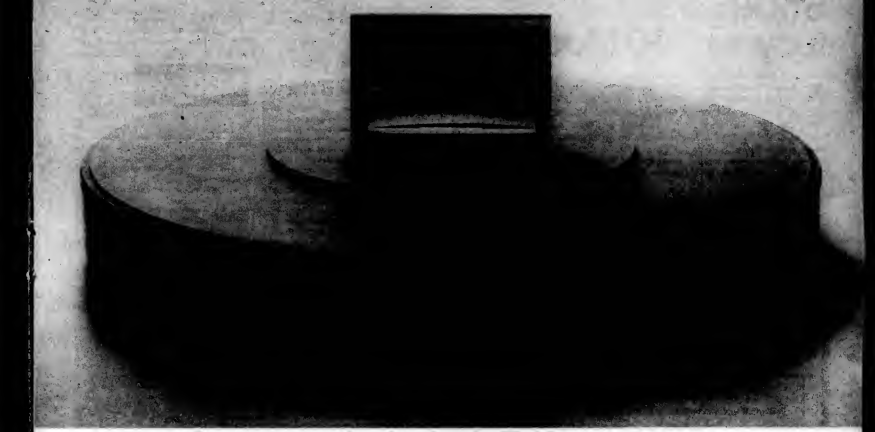
All temporary data checks are reported by Fats. A permanent data check level can be specified by the user or Fats will default to 10 retries as the definition of a permanent error. Fewer retries might be more appropriate in situations where extreme high quality is a necessity, the company noted.

Fats provides a permanent record in the form of a comprehensive detail and summary report on each tape tested. The detail portion of the report would show the approximate location of an error as well as its type so that users can determine what action could most easily resolve the problem, Innovation said.

Fats operates in 50K bytes, regardless of the number of tapes being tested concurrently. The system has been implemented under DOS, OS and VS environments and can be acquired for $750.

An enhancement option, Fast Analysis of Tape and Recovery (Fatar) will permit records containing data checks to be corrected, replaced or eliminated. This option should be ready in November for an additional $250, Innovation said from 925 Clifton Ave., 07013.

If you think all System 3 disks are alike, take a closer look at the BASF 130.



Because all single disk cartridges conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to *exceed* industry standards. It's a matter of making a disk cartridge better than you really need, because there could be times when you need it. Let's look at a few superior points of the BASF 130 System 3 disk cartridge:

The binder that won't quit

As you probably know, magnetic coating doesn't just stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure the coating won't peel or flake off.

Our own coating process

As the trend toward higher packing densities continues, it becomes increasingly important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. For those reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance

Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. We've been able to achieve a surface so flat, that the possibility of a head crash being caused by an uneven disk is completely eliminated. We might mention that the coating and binder formulation, combined with coating and polishing techniques, are all important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

And to make sure...

We test our 130 disk cartridges to standards much tighter than those of the leading equipment supplier. If anything unpleasant should happen, we'd much prefer it happen here than on your drive. As a regular procedure, we do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure balance and alignment don't shift during shipment. We test to make sure our 130 disk cartridges are error-free.

Finally

Our 130 costs no more than other System 3 disk cartridges. You're already paying for BASF quality... you might as well have it. For more information on the 130, or BASF's line of computer tape, disk packs and flexible disks, write to BASF Systems, Crosby Drive, Bedford, Massachusetts 01730.

You're already paying for BASF quality, you might as well have it.

SDI Extends Procedure Library, Billing With 'Grasp' Features

BURLINGAME, Calif. – Users of Grasp and Fmaint from Software Design, Inc. (SDI) can gain more flexibility and some new facilities, free or at little additional cost, with updates just announced by the vendor.

Grasp is a DOS/360 enhancement package that was first introduced as an I/O spooler. The latest edition includes an extended procedure library feature (Eprocs) which supports stored source programs as well as JCL.

Eprocs differs from similar facilities in other spoolers, SDI said, in that it handles the retrieval of JCL procedures at execution time rather than at spool-in-time. The ability to use temporarily assigned partition private Eprocs libraries ties in with a change in SDI's Fmaint package to support source programs, the vendor added.

Apparently in response to request s for software that would summarize job accounting data collected by Grasp, and reacting to other vendors interfacing with the Grasp records, SDI has now released Graspbil. This interpretive compiler allows user-coded billing or charge-back routines but also includes a library of basic routines.

The Grasp tape spooler facilities have been enhanced with a command that allows spool tapes to be read back and printed through Grasp's own partition, rather than through a separate partition – and separate utility program – as previously required.

The new support allows multiple reports to be spooled to the same tape, SDI added.

Each of the enhancements except Graspbil is available without cost to current Grasp users. The billing support costs $26/mo, SDI said from 880 Mitten Road, 94010.

'Tums' Eases Data Usage Under Total

ATLANTA – National Computing Industries (NCI) has introduced the Total Utility Maintenance System (Tums), which appears to provide users of the Total data base management system an alternative to a service program they could get from Cincom Systems, the Total vendor.

Both Tums and Cincom's Utility Migration System (UMS) support the building of a Total data set from card input, the validation of a Total data set and the deletion of records from a set. Dumping a Total data set to a backup tape and moving it from tape back to disk are also capabilities of both packages.

Printing a Total data set in vertical hexadecimal character format, with "no Total control records, no blank records – just data," is one of Tums' capabilities, NCI said.

Both Tums and the Cincom utility are parameter-card driven. They are also similar in price: Tums is available for $2,500; UMS, for $2,105.

Tums can select Total data according to volume and key values. A "very important capability" of the independent utility is support for reorganizing a Total data set when changes are required, NCI added.

Tums can be used with Total, versions 4 through 7, on IBM 360 or 370 equipment.

NCI is at 6075 Roswell Road, 30328.

PDP-8 to PDP-11 Move Supported by 'P103'

MOUNTAIN VIEW, Calif. – Digital Equipment Corp. (DEC) PDP-11 users with cartriffle cartridge tape peripherals are offered a wide range of software support, including a PDP-8 to PDP-11 cross-assembler, in a new version of the P103 program package from Tridata Corp., the Cartriffle vendor.

The nine-program package now includes a linkage editor and a PAL-11S assembler as well as the cross-assembler. The cross-assembler, used on a PDP-11, accepts PDP-8 PAL-III source code as input and produces comparable assembler code for the PDP-11 as output, Tridata said.

A Cartrifile editor, PAL-11A assembler and several utility programs (I/O drivers and the like) included in previous PDP-11 software from Tridata are also part of the new packaging, which is a stand-alone system requiring no operating system software from DEC.

The package can be used on any PDP-11 with a minimum of 4K memory, a teletypewriter terminal and a Cartrifile 10, 20 or 40 tape system.

The P103 package is available now for $250, a spokesman said from 800 Maude Ave., 94040.

Cope 1600 remote communications processor system includes tape storage unit, card reader, CRT console, communications processor and line printer.

Cope Remote Processor Designed to Handle SDLC

By Ronald A. Frank
Of the CW Staff

DALLAS – A programmable front end with built-in capabilities to handle IBM's upcoming Synchronous Data Link Control (SDLC) protocol has been introduced by Harris Corp.

Called the Cope 1600 remote communications processor, the front end may enable users to integrate their binary synchronous terminal equipment into an SDLC transmission network, according to a company spokesman.

The 1600 also has the ability to handle data collection, inquiry response and satellite processing in addition to controlling network transmission. It can interface with "multiple host" CPUs utilizing four separate full-duplex circuits and can run concurrently with two different remote batch emulators, the firm said.

The emulators include IBM-compatible Hasp, multileaving 2780 and 3780 support, plus Univac 200, 1004 and the full-duplex 9300 support. Card-to-tape and disk storage up to 29M bytes are available to handle the remote batch operations. The 1600 will support most CRTs, Model 33 TTYs and it can cluster IBM 2741s, the spokesman said.

The SDLC compatibility is implemented in hardware but cannot be activated in the 1600 until full details of the link control are released by IBM. By including the SDLC compatibility through a microprogrammed hardware interface, the message texts can remain transparent and can be software-compatible with any text control software, the Harris spokesman said.

The 1600 software includes the Communications, Operating System (COS), which is described as a multitask system that can interact with multiple host processors. COS is a "language compiler" that operates under either OS or VS and runs as a user task or applications program. It is compatible with Assembler G from IBM, the spokesman said.

The 1600 is a 16-bit byte-oriented processor expandable from 16K to 65K in 8K increments and includes a repertoire of 104 instructions. The front end can support up to 16 asynchronous lines or four synchronous lines at speeds up to 50 kbit/sec.

Cope peripherals introduced for earlier equipment by Harris can operate with the 1600. These include 150- to 1,200 card/min readers, 300- to 1,500 line/min printers, a 200 card/min punch, magnetic tape and disk subsystems.

The 1600 will be compatible with IBM 370x devices installed at central DP sites handling SDLC full-duplex links, Harris said. Binary synchronous terminals can be controlled from a remote 1600 which in turn could transmit the data in SDLC mode to the 370x. The front end could also be installed at a central site connected to a 360 to support an SDLC transmission link, the spokesman added.

A basic 1600 including 300 card/min reader, 300 line/min printer, two remote batch emulators and basic software will cost about $1,400/mo with maintenance. The SDLC capability will be available about two months after IBM releases full specifications on the protocol and will add about $300/mo to the system cost, the spokesman estimated.

First deliveries of the 1600 are scheduled for February 1975 from 11262 Indian Trail, 75234.

Swedish Firm Implements 'Mixed Bag'

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – When a company uses an IBM 370/158 to keep track of an insurance data base on more than 700,000 motor vehicles, it might be assumed that the rest of the configuration includes IBM equipment.

But this is decidedly not the case at Skandia Insurance Co. Ltd.

The company, one of Sweden's largest insurance firms, utilizes much independent equipment, though it does not ignore IBM hardware. According to DP manager Johannes Norrby, the most important consideration in installing devices is whether they will best fit the needs of the company.

And in implementing Norrby's policy, Skandia's 200-plus DP staff has configured a truly mixed system.

The mainstay of the vehicle registration inquiry system is a network of 180 Alphascope CRTs which operate in IBM 2260 emulation mode under Btam on the 158. The terminals are dispersed among 40 remote offices located throughout Sweden and the system includes more than 400 CRT users who handle in excess of 200,000 insurance claims yearly.

The CRT network was implemented by Anders Elwin, data communications manager, using Univac 3760 programmable front ends and an in-house developed teleprocessing handler. This handler runs under CICS and is known as Sesam, which Anders explained is an acronym for Skandia's sequential access method.

The in-house software was necessary because the vendor access method was "not adequate," Elwin said. Further, the company felt it would have cost as much to implement a full version of CICS as it did to develop the teleprocessing software with Skandia's own staff.

Programming for the vehicle inquiry/response system took "seven to eight man-years," Elwin estimated, but it was completed in two and a half months using 20 Skandia programmers.

Half of the time was spent on programming and the remaining time devoted to system debugging, according to Ingvar Lofdahl, software product manager.

The Alphascope CRTs produced by Stansaab in Sweden cost about the same as 2260s but do more, Elwin explained. Among the added features are a larger display which is easier to read, five program keys which can be user-defined along the bottom of the display, an adding machine numeric key pad and an underline capability.

Terminal inquiries access a sequential file on 3330 disks. Each record can be accessed according to account number, due date or machine address.

Individual records can be searched according to vehicle identification number or personal identification number, Elwin said. A four-year history is kept on all vehicles including taxis, buses, trucks, cars, etc.

The 739,000 vehicles in the system include about 28% of all the vehicles in the country. And a typical inquiry is answered in less than a minute, depending on the traffic load on the network.

Data is transmitted at either 2,400 or 4,800 bit/sec using lines and modems supplied by the Swedish Telecommunications Administration.

The central DP site, located here, includes IBM 3330s, Memorex 3670 disks (3330-equivalent), 13 IBM 3420-7 tape drives, an IBM 2701 controller in addition to the Univac front ends, 3270 CRTs from IBM for another application and a Qantor COM unit.

As backup for the 158 mainframe, Skandia uses a 155 attached in a multiprocessing configuration to the 158 for easy switchover. The 155 includes 512K from Control Data Corp. and a Cambridge Memories, Inc. accelerator which gives the CPU the speed of a 158, Elwin said.

CW Photo by Ronald A. Frank

Claes-Goran Gahm, Skandia TP operations manager, enters an instruction on the Univac 3760 front-end keyboard.

Ingvar Lofdahl, software product manager, enters an inquiry into the auto insurance system while Jan Blomberg, systems designer, checks the Alphascope screen.

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Service Bureau's 'Intelligence' Helps Small Banks Convert to DP

ATLANTA – A service bureau here is helping small banks in Georgia, Alabama and Florida convert from manual to automated systems through the use of key entry terminals.

First South Services, Inc. began its conversion process by having member banks submit handwritten source documents to Atlanta. The process of keypunching and verifying and checking the data took several weeks and still produced errors.

To increase data turnaround, First South Services then switched to a time-sharing computer in Atlanta. The system proved very expensive, however, and more often than not either the computer or the communications lines were out of order, a spokesman said.

Terminals Work

Then First South Services ordered four intelligent terminals, which have increased the amount of data captured and the accuracy of data collected. In addition, First South Services estimated it saves $35,000 a year with the terminals over the previous time-sharing system.

The terminals, Sycor 340s, are currently used to collect data on demand deposits, installment loans, certificates of deposit and mortgage loans. The data is entered via the typewriter keyboard by a bank employee. The CRT screen guides the operator through each data field which is defined by format programs on tape.

Standard Forms

The programs, written by First South Services, are in a format which mirrors the different forms used in the banks' operations. In this way, the operator need only fill in the blanks on the screen, as he would the source documents, the spokesman explained.

The terminal completely checks and verifies the data, as well as balancing all entries for the day. It also produces a complete name and address file and reproduces bank coupon books.

The data is then collected by a First South representative for processing on the company's IBM 370/158.

Stored for Future

The processed data is stored in Atlanta for future data manipulation, while reports are mailed back to the originating bank. When the bank wants to update its files, it sends MICR code payment coupons and forms to Atlanta.

First South Services has ordered terminals for its regional centers in Griffin, Dalton, Lyons and Valdosta, Ga. By bringing the data into the regional centers for processing, First South Services will be able to decentralize its operations—allowing it to be more responsive to the needs of its member banks, the firm said.

More Savings Anticipated

The service bureau also believes it can save an additional $70,000 a year in expenses, as well as adding its part to the fuel conservation program.

Special operators will enter the bank's data into the terminal, transmitting it in the evening to the 370/158s in Atlanta for conversion and processing. The finished data will be returned to the regional data centers, printed out and sent by courier to the appropriate banks the following morning.

IBM announces a comprehensive new approach to teleprocessing.

Teleprocessing—communicating with a central computer through remote terminals—has evolved rapidly in recent years. With it, numerous communications devices have come into use, including a variety of terminals, line control methods and programming support. Many of these elements are incompatible with one another, often requiring costly duplication of facilities.

Now IBM announces a landmark development for teleprocessing. It's called Advanced Function for Communications. And uses IBM System/370 computers with virtual storage, of which it is a logical extension.

This communications capability was formerly available only for specific industries. Now it is offered for use throughout business, industry, education and government to improve productivity and simplify the development of new applications.

The concept.

This new approach applies a unifying design to the entire teleprocessing function as System/360 did for the computer ten years ago. A combination of equipment and computer programs, Advanced Function for Communications permits users to move freely from one IBM terminal-based system to another with a minimum of application programming changes.

And since this approach establishes a clear separation between network management and user application functions, improved use of the network and a more economical framework for application growth become possible.

The programming.

With Advanced Function for Communications, one teleprocessing network is available for many uses. The network handles multiple on-line applications in a broad range of user environments. Terminals and equipment, on any line, can be shared among many different applications in the computer.

As a result, it is now possible for multiple terminals, on any line, to talk with different programs in the System/370.

A unifying design for data communications networks ... an immense step toward fulfilling the computing potential of the Seventies.

This is accomplished by three major programming elements: the virtual operating system; the Network Control Program (NCP/VS) resident in the IBM 3704/3705 Communications Controller; and VTAM, the teleprocessing access method for System/370 virtual systems.

These programs work together to build a comprehensive terminal system on a single line—using a common line discipline, a common network control program and a common access method. Networks can become easier to develop, easier to maintain.

Communications control functions are moved from the central computer and distributed into the network. This can reduce line traffic and thus lighten the load on the computer.

And because you can process more than one application on a single terminal, as well as have numerous terminals sharing a common communications line, you may be able to operate with fewer terminals and lines.

The equipment.

A family of terminals and communications products—most of which use advanced Large Scale Integration (LSI) technology—is available for use with Advanced Function for Communications. All utilize Synchronous Data Link Control (SDLC), a flexible, more efficient line control method. The 16 latest additions comprise the IBM 3767 Communication Terminal, the IBM 3770 Data Communication System and new models of the IBM 3270 Information Display System.

The 3767 is a bidirectional keyboard-printer with a speed of 40 or 80 characters per second. It can be readily incorporated into existing configurations. Some of its uses include inquiry, inquiry and update, low-volume data entry, program test and debug, and problem solving. It is equally at home in the sales department, an insurance agency or engineering office, or in the programming department.

The 3770 is a group of four different operator-oriented remote terminals, combining a keyboard and printer with a modular selection of input/output devices and communications features. For example, the 3774 Communication Terminal, with a bidirectional printer with speeds up to 80 characters per second, can become a multimedia batch terminal by adding such optional units as a card reader, a card punch, one or two Diskette® storage devices, and a line printer.

Advanced Function for Communications. It can be an immense step toward fulfilling the computing potential of the Seventies, with its emphasis on data base/data communications systems.

For more information, contact your local IBM Data Processing Division office. Or write IBM Corporation, Dept. 83F-C, 1133 Westchester Ave., White Plains, N.Y. 10604.

IBM
Data Processing Division

Network Control System Upgraded

Modem Has Adaptive Equalization

By Ronald A. Frank
Of the CW Staff

BURLINGTON, Mass. – Intertel has introduced a 4,800 bit/sec data set with adaptive equalization. At the same time, the company has upgraded its modem-oriented network control system to include the higher transmission speed.

The data set, designated the MCS 4800, can operate on multipoint or point-to-point lines on "unconditioned" 3002 private lines. It can handle either serial, synchronous or binary data formats and is compatible with simplex or half-duplex transmissions on two-wire lines, and half- or full-duplex transmissions on four-wire lines.

The 4,800 bit/sec data set utilizes quadrature amplitude modulation and it has what is claimed to be "100 times better performance" on degraded lines than most 4,800 bit/sec modems now available. The company quoted one error per million bits transmitted compared with the one per 10,000 bits transmitted said to be a current standard.

The increased performance is attributed to an automatic adaptive equalization that trains in 50 msec, improved signal structure and a coherent demodulation procedure.

Four test mode switches are included on the data set to control analog and digital loopback, to control the test pattern generator and error detector, to force the transmitter on or off and to test the unit's LEDs.

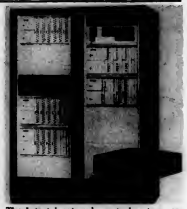
The data set includes a modem sharing option that allows up to four terminals to be shared one at a time on the MCS 4800, an auto-dial backup option which can be utilized through a Bell Data Access Arrangement, and a four channel multiplexer that allows the user to attach two 4,800 bit/sec lines on a 9,600 bit/sec facility from the phone company.

Faster Network System

The higher speed data set allows users of the Intertel network control system to expand their systems from 2,400 bit/sec to the higher transmission rate as required.

The control system essentially combines modem functions from a group of lines into one physical cabinet and controls them through common test and monitoring capabilities. A network system including one 4,800 bit/sec line, two 2,400 bit/sec lines and four 1,200 bit/sec lines in a multidrop configuration with 10 drop/line would cost about $4,800/mo or $102,000 purchase, a spokesman estimated.

Prices for the network control system range from about $1,200/mo for a three-line 10-drop system to about $30,000/mo for a system with 36 lines and 320 drops.



The Intertel network control system consists of a central site control center for two-way line testing, network diagnosis, automatic fault correction and a series of modems handling speeds to 4,800 bit/sec.

The MCS 4800 data set costs $120/mo on a two-year lease without maintenance. Purchase on the unit is $4,700 and deliveries begin this month from 6 Vine Brook Park, 01803.

Cassette Recorder With High-Speed Tape Doubles as Terminal

ROCHESTER, N.Y. – A bufferred digital cassette recorder that can operate as a terminal has been introduced by Techtran Industries, Inc.

Known as the 8400 Datacassette, the recorder includes: high-density tape storage of 145K char./cassette; switch-selectable 110-, 300-, 1,200- and 2,400 bit/sec speeds; full remote control of all machine functions; automatic high-speed search at 1,000 char./sec; plus data edit access with both character and line correction capability, the comapny said.

The 8400 also offers an MOS buffer and provides a code-controlled partial rewind feature to allow partial backup on tape for editing and retransmission purposes.

Storage or Terminal

The magnetic tape unit is designed as an add-on data storage peripheral or as a communications terminal. It is plug-compatible and speed-selectable for connection with operator-oriented keyboard printers, CRT terminals and other send/receive devices employing serial data interfaces.

The recorder is compatible for on-line connection to CPUs through data modems or acoustic couplers. It also can function as a stand-alone data collection/communications terminal, operating in either a manual or unattended mode.

The OEM price is $899, with delivery in 45 days.

Techtran Industries is at 580 Jefferson Road, 14623.

Tektronix Hard-Copy Unit Gets Multiplexer Option

BEAVERTON, Ore. – A four-channel multiplexer enables the Tektronix 4632 video hard-copy unit to make facsimile copies from up to four standard composite signals and from digital video signals of refreshed alphanumeric/graphic terminals.

The user can switch on any one of the four terminals for copying from a single terminal or can select the multiplex mode and copy all four in a four-channel queue, the firm said.

The 4632 is plug-to-plug compatible with most of the video, alphanumeric and graphic terminals in use today, the company said. Within 18 seconds, the 4632 can produce a clear 8-1/2 in. x 11 in. copy of a display, gray scale or black/white characters or graphics.

Price of the 4632 multiplexer, installed at the factory, is $500. It will be available in mid-October. Price of the 4632 video hard-copy unit is $3,395 from Tektronics, Box 500, 97005.

Bits & Pieces

3340 Fixed-Head Module Fits IBM 370/115s, 125s

WHITE PLAINS, N.Y. — IBM has extended the use of its 3348 data module with fixed head storage to allow operation on single-drive 3340 disk drives and to permit attachment to 370/115s and 125s.

Single-drive 3340s can be equipped with the fixed head feature for $20/mo under the two-year Extended Term Plan (ETP). Monthly rental is $24 and purchase price is $950.

Shipments of the data module for use with 115 and 125 CPUs will begin during the first quarter of 1975. Shipments of single-drive 3340 units with the fixed head feature and field conversion of existing drives also will begin then.

Two Randomex Disk Cleaners Tackle IBM Cartridge-Type Disks

PALOS VERDES PENINSULA, Calif. — Randomex, Inc. has introduced two automatic disk cartridge cleaners.

The Model 515 cleans front-loading IBM 2315-type cartridges and the Model 535 cleans top-loading IBM System/3-type cartridges.

The disks are scrubbed and dried with heated air in a five-minute cycle. Both units are priced at $2,160 from the firm at 27303 Warrior Drive, 90274.

Typical System/3 Installation Profiled From Canadian Users

MONTREAL — A survey taken recently throughout Canada by MBI Data Processing profiles the typical IBM System/3 computer installation in this country.

The survey shows the average System/3 installation is a batch processing Model 10 with 16K, a 5444 disk system with a 250 card/min multifunction card unit and a 200 line/min printer supported by three data recorders.

The typical installation is used by a manufacturing company, employs six DP personnel, has 146 RPG II application programs and uses 142 CPU hr/month on financial applications, MBI said.

Microprocessor Conference Set

CAMBRIDGE, Mass. — A national conference on microprocessors has been set for Dec. 2-3 by ADL/Learning Systems.

The conference is being organized in conjunction with the New York Management Center and will be held at the Sheraton Boston.

The conference will be directed toward managers in product planning, engineering and R&D and to market and corporate planners charged with analyzing new investment and venture opportunities.

ADL Learnings Systems is at Acorn Park, 02140.

Auerbach Study Claims

360/370 Design Poorly Suited to VS

PHILADELPHIA, Pa. — IBM's basic 360/370 architecture is poorly suited to virtual storage and interactive applications, a team of Auerbach analysts concluded recently.

The traditional "channel to central processor" architectural scheme still used in almost all IBM machines is the most economical approach to batch processing, but it tends to get bogged down when it has to handle many unscheduled interrupts or disk memory accesses, their report said.

The Auerbach study — aimed mainly at determining the effects of mainframe architecture on computer performance — concluded that there are really only three basic architectures used in general-purpose computers today.

Within these basic types, differences in performance are due mostly to minor variations in the implementation of the fundamental theme.

Users, the analysts commented, may lose sight of this fact as they listen to the claims of mainframe salesmen who try to put across the idea that their machine's "unique architecture" is especially suited to a certain environment.

Vendors are actually putting less and less emphasis on the details of system operations when they talk to prospects these days, the report stated. The trend is to stress the usability and adaptability of machines — and how they can "run themselves" under the supervision of sophisticated operating systems and high-level language instructions.

The importance of the underlying machine architecture is its efficiency in handling this burden of operating system overhead.

"If a system promises an application or capability not inherent in its architecture, you can bet its operating system suffers extensive overhead in applying that application to the architecture," said the Auerbach study, citing the IBM virtual storage system as "a famous example."

In that instance, "the overhead is such that as many as 20 instructions (worst case) may be required in a VS system for every one instruction needed to perform a task in a real memory system," the report said.

The study, "Computer System Architecture," identifies the three basic architectural schemes as:

- Channel to central processor, in which information is fed directly over I/O channels to the processor.
- Channel to memory/system controller, in which all access and transmission to or from devices, the central processor and main memory are controlled by the system/memory controller.
- Channel to main memory, in which all data is required to be transmitted directly to a port of main memory where it can be stored for later access by the central processor or by other devices.

The channel to central processor architecture is found in all IBM CPUs except the 370/115 and 125, all NCR CPUs, the Honeywell 2000 series CPUs and the Univac 90/60 and 90/70 CPUs.

While this architecture is relatively inexpensive, Auerbach found that central processors must be extremely fast to overcome a major weakness in this architecture type, "specifically an inability to respond quickly to frequent unscheduled interrupts.

"This weakness is the parent cause of several related weaknesses: first, only a limited number of I/O channels can be attached and serviced simultaneously. The central processor otherwise would spend most of its time servicing I/O interrupts.

"Second, a large number of unscheduled I/O requests are normal in interactive processing and in virtual memory systems. The channel to central processor architecture type is therefore wanting in such environments, since the operating systems suffer extensive overhead in trying to compensate for the architecture."

The problem with CPUs of the channel to main memory architecture, according to Auberbach, is such distributed processing systems offer more options, such as additional memory ports and independent I/O controllers and processors. "All of these items, while capable of extending the power of a system, add significantly to the cost of the system," the report stated.

Systems using this architecture include the larger Burroughs CPUs, Control Data Corp. Cyber 70s, Digital Equipment Corp. Decsystem-10s, and Xerox units.

Other topics discussed in the report include device controller channel arrangements, including a discussion of the tendency to integrate and its effect on systems performance; I/O channel types; modes of channel selection; and system enhancements, such as control memory, buffer memory and peripheral processors.

Comparison charts summarize the architectural details of each major general purpose CPU and in the report the charts are supplemented with tables giving performance characteristics.

The report is available for $25 from Auerbach at 121 N. Broad St., 19107.

Datatype Ups Page Reader Speed, Releases Model 500 With Micro

MIAMI — Datatype Corp. (DTC) has added two optical page readers to its present line.

The Model 400 is a direct replacement for DTC's present models 100, 200 and 300, but offers:

- Increased reading speed from 54- to 110 char./sec.
- Elimination of all mechanical adjustments after the unit leaves the factory.
- Existence of only two electronic adjustments.
- Absence of mechanical clutches and brakes to advance the paper through the machine.
- Return of paper to the front of the unit.

The Model 500 is a Model 400 with a microprocessor added. The processor has 45 generalized computer instructions for tailoring the unit to each application's specific requirements.

When parity errors are present on the OCR document, the unit will reread typed lines in order to correct the error.

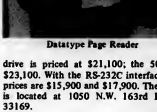
The microprocessor's memory provides the capability to output all coding formats (TTS, Basdoc, Ascii, BDC, Ebcdic), according to DTC.

With the 500, programmable groups of characters are stored in the microprocessor memory for outputting commonly used messages and control codes as a result of one keystroke on the typewriter.

Practically any standard CRT terminal can be connected to the unit to provide a variety of different operational modes, DTC added.

The units read a special font printed from an IBM Selectric type ball which consists of the character with a small bar code directly underneath the character.

Both models can be purchased as standalones or with an RS-232C interface. The 400 with a 7- or 9-track 800 bit/in. tape



Datatype Page Reader

drive is priced at $21,100; the 500 at $23,100. With the RS-232C interface the prices are $15,900 and $17,900. The firm is located at 1050 N.W. 163rd Drive, 33169.

Mo. Officials Take Crash Course To Implement Consolidation Law

By Nancy French
Of the CW Staff

JEFFERSON CITY, Mo. — Key state officials here, including the governor and selected legislators, have gone back to school to learn about the mysteries of computer technology as a result of a new statute reorganizing the state's DP management function.

The statute, which became effective this summer, has consolidated the responsibility for coordinating the state's entire DP effort within the Department of Administration.

And state officials agreed they needed a crash course to help them make the choices that would make consolidation work.

Thanks to a five-man task force, provided to the state at no cost by Southwestern Bell Telephone Co. under the Loaned Executive Action Program (Leap), a five-year plan has been drawn up to implement the consolidation.

Rather than getting into questions concerning specific department applications, the team concentrated on assisting the Department of Administration in planning implementation of the statute.

According to Ellis Bick, Southwestern Bell's mechanization supervisor and head of the five-man team, their efforts were invested in three general areas: technology, personnel and organizational matters, center planning and job accounting.

In the technological area, the team recommended systems and programming standards, suggested new procedures to upgrade security in the various DP centers and drew up guidelines for data communications, time-sharing, data base management and operating standards.

Government Borrows Executive Talents

JEFFERSON CITY, Mo. — The Loaned Executive Action Program, known to Missourians under the acronym Leap, is a one-time-only, six-month program designed to encourage citizens to contribute business expertise to the executive branch of the state government.

Under Leap, executives employed by businesses in the state are loaned to the government for renewable periods of one week to three months.

While serving in Jefferson City, their salaries and living expenses continue to be paid by their companies.

Budgeted by the legislature, Leap is nonpartisan, nonprofit and tax-exempt, and companies who contribute manpower and/or funds to the program can deduct those expenses from their income taxes.

Ellis Bick, who under the Leap program served three months in the state's Department of Administration, explained that 45 executives assigned to projects throughout the government started the program with him.

After the first three months came to an end, many stayed on for the second three-month term and others were brought in, bringing to about 80 the number who served.

Bick stated that, in his view, a key to the success of the program is total support from Governor Christopher Bond.

He identified as crucial to its long-range success, however, the ability to communicate funding needs to the legislature which controls the budget.

"If the legislature is not on board, we've missed the final link in the chain," he said.

The program is headed by John Fox, a senior management analyst from the Office of Administration.

For an investment of $70,000 in state funds, the taxpayers benefitted from about $1,5 million in consulting services, according to Fox.

In the area of personnel and organizational matters, they suggested ways of establishing a DP training program, developed a career path structure for DP employees and recommended an executive management seminar on computer concepts to give the state's decisionmakers a better understanding of DP and a greater ability to communicate with DP people.

In the third area, the team concentrated on developing guidelines for long-range computer center planning, equipment planning, system optimization and job accounting procedures.

Final approval for implementing the recommendations rests with the Government Advisory Committee, composed of the 14 department heads who report to the governor.

"They have authority to decide to implement the final 12 recommendations, table them or modify them, and so far

(Continued on Page 31)

Mini Acts as All-Purpose Teaching Unit

ORLANDO, Fla. — When it came to teaching systems programming to advanced graduate students in computer science, the professors at Florida Technological University here opted for a minicomputer.

A major reason for the selection of a minicomputer specifically for teaching, according to Prof. Charles Lindahl, was the need to stop the machine frequently to examine the internal state of programs, tables and files.

This requirement made it impossible to use the university's central time-shared system as an instruction device.

Prof. David Falconer explained that the department selected a Varian 73 minicomputer because its microprogramming capability allows the user to change his instruction set "on the fly" and to experiment with different sets for different applications. Falconer believes that this is an important trend in current computer science.

The specialized controllers being used to run intelligent peripheral devices, he observed, are actually microprogramming units that carry specific instructions for such functions as file-handling and message-switching. He expects the use of such units to become increasingly widespread.

Another advantage of the Varian 73, a capability which permits the use of multiple processors on the main memory, allows Falconer and Lindahl to use the small computer to demonstrate all of the important characteristics of large machines now in general use.

The system currently consists of the Varian 73 (with 24K memory), two teletypewriter terminals, one CRT, two cassette-tape units, disk memory with a total capacity of 2.5M words and a general-purpose I/O register which accommodates special-purpose logic modules.

State Officials Take Fast Course

(Continued from Page 31)

they've approved every one they've discussed," Bick said.

Before the new statute, each department had its own computer, according to Bick.

Under the new system, "some are going to lose them," he said.

Bick noted that many managers believed giving up departmental control of the computer was synonymous with deteriorating service.

The team had to work hard to convince DP managers that "deterioating service is not a result of consolidation but rather of poor management or mismanagement," he said.

"It does take better management to run a consolidated program where you have to resolve scheduling conflicts to satisfy many more users," he remarked.

The overall program will reduce not only the number of computers but more importantly, the cost to taxpayers.

Avoided Naming Vendors

Bick said the team did not make any recommendations as to which centers should be combined.

"What we did was lay down the guidelines the state should use in looking at this problem in more depth," he explained.

As for vendor considerations, Bick said the team "avoided that like the plague."

"It wasn't our role to get into vendor analysis or vendor performance; that's a very political thing," he explainɔd.

He did agree, however, that consolidation was bound to favor some vendors "that can meet large-scale processing needs."

"It's a matter of survival of the fittest," Bick said, "but I don't think it's going to give anybody a monopoly."

Citing the high turnover rate in the state's DP jobs, Bick said "attrition" would even out any staff reductions.

"We don't want to happen here what's happened in other states where consolidation has gotten off to a bad start by solidifying resistance to it within the operating departments," he said.

Bick emphasized that the state was by no means "stumbling and fumbling" in its move toward consolidation.

"The state's DP management had a lot of strength," he explained, "but like any other consultants, we concentrated on its areas of weakness."

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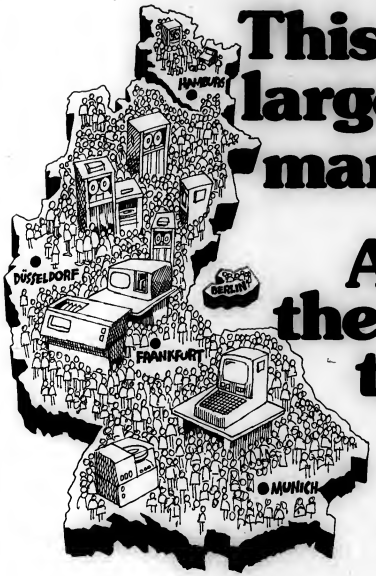


COMPUTERWOCHE
Die aktuelle Wochenzeitung für die Computerwelt
TeleRanken Computer

It's called *Computerwoche*, (woche is pronounced vō-kuh), and it's *Computerworld*'s new sister in Germany. Modeled after its parent, *Computerwoche* will serve key computer users in Europe's largest EDP market. It will have an initial circulation of 22,000 including company officers, managers and top technical people at user sites throughout the German market, as well as officers and planners at computer equipment producing companies. Publication begins in October 1974 and will be weekly starting in January.

Computerwoche is published by Computerworld GmbH, with a full editorial and production staff based in Munich, and it will serve the German market with the same editorial excellence that has made *Computerworld* a leading EDP publication in the United States. A recent readership study by IDC Deutschland has shown that German users give highest readership priority to information on new products and services and new techniques for the application of computers. And *Computerwoche* will focus on serving those needs.

The market which *Computerwoche* serves is large and growing. At the end of 1973, there were 11,000 computer systems in Germany, valued at just over $4 billion, and recent market studies indicate that expenditures will be growing rapidly over the next four years. Overall user spending is expected to grow at 14% a year, and areas like terminals and communications equipment and software and services are expected to average growth rates of 25%–30% a year.

TO: Neal Wilder
Vice President, Marketing
Computerworld
797 Washington Street
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COMPUTERWORLD

'Microprocessor Revolution' – Here and Now

•Software Design Major Hurdle In Developing, Selling Systems

By Molly Upton
Of the CW Staff

LOS ANGELES – Software design is the major hurdle to the advancement and acceptance of microcomputer-based systems, Gary A. Kildall of the Computer Science Group, Naval Postgraduate School, told attendees at the Wescon session on "The Microprocessor Revolution."

"Never before has software design been as important. Reliability and correctness of programs directly determines the quality of a product manufactured in the thousands," he said.

Kildall urged attendees, as customers, "to encourage the industry to offer and support the tools necessary for effective program development and adaptability.

"Although there are tremendous savings in software development when compared with hardware breadboarding, there are also inherent difficulties in controlling the evolution of a software-based product," he remarked.

The microprocessor, he said, can reduce time and cost in product specification, development and production in many designs by providing central and peripheral control and processing.

As a critical part of the microprocessor, the software must give the product adaptability to new environments. "A product must be planned with change in mind in order to extend its sales window beyond the next unpredictable technological breakthrough," he reminded attendees.

Principal Elements

The principal elements of software adaptability are maintainability, expandability and portability, Kildall said.

"In this rapidly moving industry, the ease with which programs can be effectively moved between machines of differing design while being readily understood by a number of different programmers may be the most important single influence upon the software evolution cycle," he noted.

Kildall endorsed high-level systems languages as a means to "produce quality software systems for supporting a constantly evolving product definition."

High-level systems languages promote the enforcement of subroutine linkage

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CW at Wescon

•Micros, Semis, LSI Equipment Spawning 'Component' Computer

By Molly Upton
Of the CW Staff

LOS ANGELES – The day of computers as components is dawning with the development of microprocessors, semiconductor memories and LSI communications devices, Steve Teicher and Gordon Bell of Digital Equipment Corp. told a Wescon session on "The Microprocessor Revolution."

Distributed processing power, more reliable network systems and systems better tuned to applications are some of the real advantages of the microprocessor, they said.

Teicher and Bell foresee widening use of specialized microprocessors cutting the number of customer interface transducers and programs.

"The range of transducers will be greatly expanded due to the vastly increased applications base," they said.

With higher capability tools, engineers now "concentrate on applications-oriented problems instead of the details of implementation lying across a multilevel, multidiscipline design," they noted.

Although larger modules resulted as chips became more complex, the trend will be toward smaller microcomputer modules, they said, noting testing and repair costs will help promote the smaller modules. "In the long run, we believe computer packages will become more application-driven.

"Network systems could be more reliable than traditional megacomputers, because the number of critical nodes can approach zero, while providing much redundancy," they said.

"The cost of incremental processing power will be small; therefore, systems will be better tuned to applications than they are today," observed Teicher and Bell.

Universal Part?

In the same session, David Chung of Fairchild Semiconductor outlined what the microprocessor needs to become a truly cost-effective "universal part."

Currently, micros intended as low-cost minis are cost-effective only in limited applications, he noted, because they require at least 20 chips to implement a useful function. Even then the performance level is lower than that of a multichip CPU, he said.

Microprocessors need:

- Minimum parts count for a useful system.
- Ability to interface to a wide range of devices without special circuits.
- Ease of programming and debugging.
- Connectability into a network of independent microprocessors.

Chung noted a useful microprocessor system must include random-access memory (RAM), read-only memory (ROM), I/O circuits, interrupt structure, timer, clock generators, computing electronics and power-on reset.

Current technology permits the fabrication of a two-chip system, one with the CPU and the other a program storage chip.

A key feature of a universal microproc-

(Continued on Page 34)

•2d-Generation MOS Unit Price Could Plummet to $10 or Less

LOS ANGELES – The cost of a second generation MOS microprocessor will be $10 – or less – in two to four years, according to Mona M. Saba and Jack D. Grimes of Tektronix, Inc.

Speaking at a Wescon session on "The Microprocessor Revolution," they explained that price/volume estimates over time are used to project price information.

Since 8080s and 6800s have not been produced in sufficient volume for the manufacturer to be confident in price/volume predictions, any long-term estimates "are guaranteed to be high and not reflect the second sourcing completion likely to occur in this generation of microprocessors," they said.

They deduced that these chips are "about the same size as the 2102-type random-access memory (RAM) which is less than $10 in large quantities today and the 4K RAM which is headed for $4 in 1976."

Real Expenses

Saba and Grimes advised designers that "both ROM [read-only memory] and RAM should be considered free when approaching a microprocessor-based design."

More attention should be focused on those elements that cost money, such as power supplies, packaging, electromechanical areas and analog circuits.

Their projection of semiconductor RAMs shows the cost/bit as 0.1 cent in 1976 for a 4K by 1 device, dropping to half that, or .05 cent, in 1978 for a 16K by 1 device. In 1980, they predicted, the cost/bit for a 16K by 4 device will be .025 cent.

"Considering only the price of the individual microprocessor could be very misleading in most cases," they added, stressing that the system as a whole is more important.

Designers need to do a complete systems design before a single run is laid out on the circuit board, they added.

Microprocessor vs. standard MSI and SSI logic packages, custom or off-the-shelf microprocessor, mask-of-field programmable ROMs are only some of the

(Continued on Page 34)

Intel Bipolar Family 'Outclasses' 8080

SANTA CLARA, Calif. – Intel Corp. has developed a new family of bipolar microprocessors that represent "an order of magnitude" improvement above the 8080 family, according to a company spokesman.

The two units, the 3001 micro control unit (MCU) and the 3002 central processor element (CPE), are the major components of the bit/slice microprogrammed computer. The 3001 and 3002 are Schottky bipolar LSI elements that the firm expects will become standard components in high-performance systems.

Typical cycle time should be 125 nsec/microcycle. In terms of raw compute power, this is about 15 times faster than the 8080, the spokesman said.

The minimum slice is two bits wide and slices can be stacked in parallel for as many as are required or up to 2^n bits wide, he stated.

The CPE contains 128 microinstructions. The microcode enables the system to perform an operation, test the result and branch on that result in one microcycle, the spokesman added.

MOS Costs Seen at $10 or Less

(Continued from Page 33)

decisions that must be made.

Sabe and Grimes have updated the rule of thumb that a microprocessor is feasible if more than 50 MSI and SSI packages are necessary to implement the controller with random logic. The figure is now between 30 and 40, they said, and is expected to drop to the low 20s in a year.

Also, by using a microprocessor, 1K bytes of ROM replace about 50 to 100 integrated circuits, saving about $75 to $300, they said.

Robert F. Wickham of Creative Strategies, Inc. listed the three types of microprocessor architectures in use or development:

- The one-bit serial approach, used for calculators and small controllers, is applied to relatively high-volume products.
- The parallel bit machines are on the market with data word sizes of four, eight and 12 bits. Sixteen-bit devices will soon be available, he predicted.
- The third approach involves "subdividing the processor into slices with each slice containing two or four bits of a parallel processor." These can be cascaded to build parallel processors up to 32 bits wide, he said.

The earlier one-, four- and eight-bit machines used P-channel MOS with relatively slow instruction execution times, he said. The second generation, using N-channel MOS, will increase speed by a factor of five to 10.

Chip designs using CMOS are rare at present, he added.

In addition, the "dark horse" silicon-on-sapphire (SOS) offers increased speed and circuit density.

The list indicated "there are enough different devices now available that no single device should be considered the universal microprocessor," Wickham said.

'Component' Computer Advancing

(Continued from Page 33)

essor is the ability to perform I/O directly, he said. Hardware features such as interrupt structure, timer and I/O ports must be incorporated on the chip so "that the idiosyncrasies of a majority of the I/O devices can be comprehended in the microprocessor program."

To simplify programming and debugging, a nonvolatile RAM "will break the final resistance on the part of small quantity users to the use of microprocessors."

Although a low-cost nonvolatile RAM has not been developed, the EAROM and programmable read-only memory (Prom) are "reasonable facsimiles."

The upper limit of a microprocessor's performance, defined by its most demanding task, can be defied, Chung claimed.

"Should the architecture of the microprocessor be such that an indefinite number of similar microprocessors can be grouped together to solve a complex problem in a piecemeal fashion, then the application horizon of the microprocessor becomes unbounded," he said.

Micro-Mini Market Distinctions Hazy as Single-Chip Sales Soar

LOS ANGELES – Once considered distinct by most observers, the line between the markets for minicomputers and microcomputers is now blurring in some analysts' eyes.

Sales of U.S.-produced microprocessors, or single-chip CPUs, will jump from 200,000 sets worth $15 million in 1973 to about 500,000 sets worth about $65 million in 1974, Robert F. Wickham of Creative Strategies, Inc. told a Wescon session on "microprocessors – market, design, applications."

Unit sales should come close to doubling again in 1976, he said. These figures exclude captive production of custom devices by companies like IBM and NCR.

The average selling price of the set of devices used in microprocessor applications should increase as the product shifts mix toward larger eight-, 12- and 16-bit processors.

"By 1976, the average price of a microprocessor set could be close to $150 despite the use of lower cost four-bit units in the calculators, appliances and automobiles," he said.

In 1973, most microprocessors were four-bit with relatively small amounts of read-only memory (ROM) and random-access memory (RAM) and were used in calculators, point-of-sale (POS) systems and small industrial control systems.

This year, the production mix contains a "significant percentage" of eight-bit processors which go into terminals, calculators, word processing and small business accounting systems.

Growth Limits

The growth of the market is limited by the rate at which the engineering community can include microprocessors in new equipment designs, Wickham observed.

The question of whether the semiconductor companies are competing with the microcomputer houses is "far more complex than it appears," he said.

Users of minis and submini equipment now have a greater range of sources, "depending upon the degree of risk and amount of applications expense they want to shoulder," he added. "A very high percentage of the stripped down minis sold are 'overkill' for their applications.

"In spite of the low cost there is definitely a need to complete the range of processor capabilities available for use in small systems," he said.

In another microprocessor session, Mona M. Saba and Jack D. Grimes of Tektronix, Inc. echoed Wickham: "Microprocessors are very viable [minicomputer replacement] candidates in systems which originally included a mini to perform some limited computation and control, and where speed is not a critical design consideration. In such cases, the mini is an overkill and replacing it with an off-the-shelf microprocessor offers great economic advantages."

Where do microprocessors really fit? According to Wickham, "the true role of the this new microprocessor-based computer/control capability appears to be in the area of small, dedicated systems in which the microcomputer is an integral part of the system and is buried in the electronics package.

In a paper entitled "Microprocessors for Dedicated Control," Mat Biewer of Pro-Log Corp. pointed out that new developments in microprocessors are being dictated by the computer industry, while the dedicated control market is silent in demanding a better microprocessor as a logic processing element.

"Microprocessors are thought of as computers and without any challenge to this thought, it is only natural they should evolve to be better computers," Biewer said.

Software Major Design Hurdle

(Continued from Page 33)

standards, encourage modular programming and makes practical the construction of comprehensive subroutine libraries, he said.

Mona M. Saba and Jack D. Grimes of Tektronix, Inc. pointed out that the use of microprocessors requires some new design approaches, i.e., "the electrical engineer needs to develop some programming skills."

Speaking at the session on "Microprocessors – Market, Design, Applications," Matt Biewer of Pro-Log Corp. acknowledged that some of the tools developed for the computer industry designer can be applied to microprocessors.

But "effective use of microprocessors for random logic also requires program design discipline not usually exercised in the DP environment," he said.

He explained the designer must use "the same design documentation disciplines exercised in hard-wired logic designs" and learn to partition programs with a view toward flexibility.

Sophisticated tools such as the higher-level computer-aided design techniques of assemblers, compilers and simulators "have not yet been fully developed to service the requirements of the hardwired logic replacement market," he said.

Bernard W. Jordan Jr. of the Departments of Electrical Engineering and Computer Sciences, Northwestern University, added that in training logic designers educators must be sure that students "become more competent in what have traditionally been software notions."

Similarities between hardware and software should be stressed and students should be aware of trade-offs between a "hardware" and a "software" approach to a problem, he said.

DEC's Change Reese checks out Decpack disk drive.

Norm Wolfe and Mark Solie work on HP 9610B industrial measurement and control system.

Wang exhibit manager Robert Cunningham puts together a disk.

Fred Lenna, production manager at Macrodata, puts final touch on MD 104M IC tester.

Behind the Wescon Scene

LOS ANGELES – A tour around the floor of the Convention Center here 24 hours before the opening of the Western Electronic show and Convention found the usual shirt-sleeve excitement of getting DP equipment installed, up and running.

Amidst the hubbub, the calculator group at Hewlett-Packard (HP) enjoyed the reward of unpacking early and played what was sure to be a hit with attendees, an interactive lunar landing program run on a 9821A calculator and drawn on a 9862 plotter.

But the heavy hardware was upstairs, where systems analysts were working to bring up several HP2100-based data acquisition systems from HP's Automated Measurement Division and a System 3000. A company spokesman explained that people interested in these systems would ask at the downstairs booth and be referred upstairs, where at least four systems were on display.

Data General also had a room upstairs, in addition to its Dual Novs on the exhibit floor.

Steve Stark attends HP data acquisition system.

DEC Matrix Printer Maintains 'True 30 Char./Sec' Output Rate

LOS ANGELES – A "true 30 char./sec" matrix printer that maintains 300 bit/sec throughput was unveiled by Digital Equipment Corp. (DEC) at Wescon here last week.

Priced at $1,250 in quantities of 100, the keyboard printer features 128-character upper- and lower-case Ascii set with characters formed in a 7 by 7 dot matrix.

'Catch-Up Speed'

The Decwriter II maintains a true 30 char./sec printing rate through the use of a buffer and a 60 char./sec "catch-up speed" for printing immediately after a carriage return or line feed. This eliminates the need for fill characters, the company said.

The printer accommodates standard computer forms 132 columns wide and has a tractor-driven paper feed and a pin feed and can print six-part forms. The paper width is variable from three in. to 14-7/8 in.

Delivery is scheduled for November from the Components Group, 1 Iron Way, Marlboro, Mass. 01752.

CW Photos by M Upton

Roy Lomicka, design engineer, and John Wollaver, product manager, load demonstration program for Decwriter II Printer.

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COMPUTERWORLD

Revenues Up 59%

DEC Earnings Rise 89% in Record Year

MAYNARD, Mass. – Digital Equipment Corp. (DEC) has ended its fiscal year with a whopping 89% rise in earnings and a 59% increase in revenues over those of fiscal 1973.

The results of the fourth quarter and year set records, with the fourth-quarter sales and earnings being the highest for any three-month period in the company's history.

For the year, revenues totaled $421.9 million compared with $265.5 million last year, while earnings rose to $44.4 million or $3.80 a share from $23.5 million or $2.16 a share last year.

Fourth-quarter revenues rose 57% to $135.2 million compared with $86.3 million in the year-ago period.

Earnings jumped to nearly $16 million or $1.36 a share compared with $9.3 million or 85 cents a share in the same 1973 period.

President Kenneth H. Olsen said, "We remain cautious but optimistic for fiscal 1975 in spite of prevailing economic uncertainties. We see continued growth of the minicomputer industry spurred by new applications and the increasingly favorable price/performance characteristics of our products."

Cumulative worldwide installations of DEC minicomputers total over 35,000 units, the firm said.

HP Cites International Order Rate In 118% 3d-Quarter Earnings Spurt

PALO ALTO, Calif. – Hewlett-Packard Co.'s third-quarter earnings grew 118% this year, outpacing the 42% jump in revenues.

Orders from abroad grew 46% over the same period last year compared with a 19% rise in domestic orders.

Earnings for the third quarter totaled nearly $23 million or 84 cents a share compared with $10.6 million or 39 cents a share in the year-ago period.

Revenue grew to $233.6 million from $164.1 million in the same 1973 period.

For the nine months ended July 31, earnings rose 72% to nearly $58 million or $2.14 a share compared with $33.8 million or $1.26 a share.

Revenues rose 41% to $639.2 million from $454.7 million in the year-ago period.

Orders for the quarter totaled $246.8 million, a 24% gain over orders booked in the same 1973 period. For the nine months, orders totaled $689.8 million, up 30% from a year ago.

"International markets have been particularly strong," said President William R. Hewlett, "with orders from foreign customers amounting to $323.4 million for the nine-month period."

National Securities Clearing Unit Signs Bradford to Stem DP Losses

NEW YORK – National Clearing Corp., arm of the National Association of Securities Dealers (NASD), has attempted to stem its DP losses by turning to Bradford Computer & Systems, Inc. for facilities management.

At the same time, the move delays by one year the possibility of the proposed unified clearinghouse concept being investigated by the major and regional exchanges and gives Bradford a front row center opportunity for a nationwide contract.

"Bradford has significant capability, and it may be able to demonstrate to the rest of the industry that it is a contender to run any nationwide system," observed Gordon Macklin, NASD president.

The agreement with Bradford, effective Oct. 1, guarantees National Clearing between 16% and 20% of the annual revenue paid into the system by member securities firms.

The contract "assures National Clearing profitable operations, even in times of significantly declining volume. It converts our current loss to an immediate profit through our ability to share in revenues. We are able to cut our loss short, but retain the flexibility to participate in any national system," Macklin added.

National Clearing had lost $600,000 in the 10 months ended July 31 and was recently running at a $45,000/mo loss.

The agreement with Bradford is cancellable with penalty after each of the first two years and after three years without a penalty payment.

Dataproducts' Bottom Line Drops

WOODLAND HILLS, Calif. – The bottom line at Dataproducts Corp. showed a decline in first-quarter earnings although there was a 25% improvement in operating income and a 24% increase in revenues.

Backlog rose 42% to $51 million from $36 million in the year-ago quarter.

"The strong incoming order rate that resulted in the record backlog is especially significant in view of the record shipments for the quarter and provides a strong base for further improvements in performance for the remainder of the year," said President Graham Tyson.

Earnings fell to $1.4 million or 20 cents a share from $1.7 million or 25 cents a share in the year-ago period, when a $618,000 special credit was included.

Revenues rose to $23.4 million from $18.9 million in the same 1973 period.

New Registrations

CALIFORNIA COMPUTER PRODUCTS, INC., 2411 W. LaPalma, Anaheim, Calif. 92801, a peripheral equipment manufacturer, filed to register 151,000 shares of common in exchange for the outstanding shares of Xytex Corp., Boulder, Colo., at the rate of one Calcomp share for 1⅛ Xytex shares. No underwriter is involved.

IFOTRONICS CORP., P.O. Box 2209, Boulder, Colo. 80302, a digital electronics manufacturer, filed to register 3,273,800 shares of common in exchange for the outstanding common of Missouri Veterinary Supply Co., Inc. of Higginsville, Mo., at the rate of five Infotronic shares for each outstanding share of Missouri. No underwriter is involved.

COMPUTER IDENTICS CORP., 21 Dartmouth St., Westwood, Mass. 02090, an industrial control systems firm, filed to register 642,019 shares of nonvoting redeemable preferred upon receiving a plan which changes and reclassifies the common shares into preferred. No underwriter is involved.

Earnings Reports

BOLT, BERANEK AND NEWMAN
Year Ended June 30

	1974	1973
Shr Ernd	$1.02	$.80
Revenue	22,079,900	16,697,300
Disc Op	.....	169,600
Spec Chg	.....	a4,500
Earnings	1,269,600	1,002,800
3 Mo Shr	.30	.10
Revenue	6,399,400	5,001,500
Disc Op	.....	22,200
Spec Chg	.....	b147,300
Earnings	370,900	117,300

a-Loss on sale of Wood Flong, Inc. less a gain on disposition of long-term investment and gain from adjustment of extraordinary loss from discontinued operations in 1972. b-Loss on sale of Wood Flong, Inc.

WANGCO
Three Months Ended June 30

	1974	1973
Shr Ernd	$.40	$.27
Revenue	4,949,879	2,911,383
Earnings	434,096	295,274
9 Mo Shr	1.12	.74
Revenue	12,800,701	7,326,645
Tax Cred	.....	63,300
Earnings	1,227,349	792,972

TEXAS INSTRUMENTS
Three Months Ended June 30

	1974	1973
Shr Ernd	$1.10	$.90
Revenue	403,386,000	316,382,000
Earnings	25,229,000	20,391,000
6 Mo Shr	2.19	1.73
Revenue	778,865,000	605,390,000
Earnings	49,983,000	39,255,000

VARIAN ASSOCIATES
Three Months Ended June 28

	1974	1973
Shr Ernd	$.34	$.26
Revenue	76,038,000	62,822,000
Earnings	2,289,000	1,790,000
9 Mo Shr	.88	.69
Revenue	213,441,000	178,394,000
Earnings	5,911,000	4,863,000

COMPUTERVISION
Three Months Ended June 30

	1974	1973
Shr Ernd	$.25	$.16
Revenue	6,794,000	3,716,000
Earnings	580,000	345,000
6 Mo Shr	.47	.29
Revenue	12,325,000	7,082,000
Earnings	1,078,000	648,000

COMPUTER AUTOMATION
Year Ended June 30

	1974	1973
Shr Ernd	$1.13	$.75
Revenue	19,653,000	11,264,000
Tax Cred	.....	187,000
Earnings	1,894,000	1,192,000

CUBIC
Three Months Ended June 30

	1974	1973
Shr Ernd	$.21	$.07
Revenue	20,726,900	15,818,200
Earnings	480,900	166,100
6 Mo Shr	.45	.27
Revenue	39,136,000	29,400,100
Earnings	1,018,400	610,900

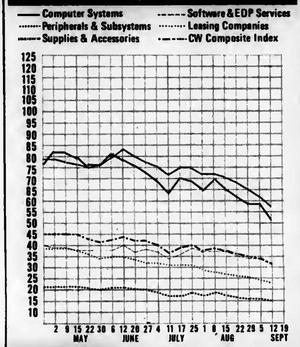
MILGO ELECTRONIC
Three Months Ended June 30

	1974	1973
Shr Ernd	$.60	$.51
Revenue	8,950,000	5,516,000
Earnings	949,000	807,000
9 Mo Shr	1.63	1.44
Revenue	22,579,000	15,621,000
Earnings	2,565,000	2,298,000

COMPUTER INVESTORS GROUP
Three Months Ended June 30

	1974	1973
Shr Ernd	.....	$.05
Revenue	$6,484,921	5,049,938
Earnings	(227,679)	101,524

COMPUTERWORLD Computer Stocks Trading Indexes



Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		PRICE 1974 RANGE (1)	CLOSE SEP 12 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	73-217	73	-6 7/8	-8.6
O	COMPUTER AUTOMATION	8- 14	8	-2 1/8	-20.9
N	CONTROL DATA CORP	14- 38	13 1/2	-4	-22.8
N	DATA GENERAL CORP	16- 38	17 3/8	- 1/4	-1.4
O	DATAPOINT CORP	8- 15	8 1/4	- 1/2	-5.7
O	DIGITAL COMP CONTROL	2- 5	2 1/8	+ 1/8	+6.2
N	DIGITAL EQUIPMENT	74-121	74 3/8	-8 1/4	-9.9
N	ELECTRONIC ASSOC.	2- 3	1 3/4	- 1/8	-6.6
A	ELECTRONIC ENGINEER.	5- 11	5 1/4	- 3/8	-6.6
N	FOXBORO	22- 48	22 7/8	-1 1/8	-4.6
O	GENERAL AUTOMATION	23- 40	23	-3 1/2	-13.2
O	GRI COMPUTER CORP	1- 2	1/2	0	0.0
N	HEWLETT-PACKARD CO	64- 98	63 1/2	-6	-6.6
N	HONEYWELL INC	38- 86	30 3/8	-5 1/4	-14.7
N	IBM	157-251	156 1/2	-25 3/4	-14.1
O	INTERDATA INC	0- 22	13 3/4	-5 1/4	-27.6
O	MICRODATA CORP	2- 5	2 3/8	- 3/4	-24.0
N	NCR	19- 40	19 1/4	-6 1/2	-25.2
N	RAYTHEON CO	24- 39	23 5/8	-4 1/8	-14.0
N	SINGER CO	15- 40	15 1/4	-4 5/8	-23.2
N	SPERRY RAND	25- 44	24 3/8	-8 5/8	-15.7
A	SYSTEMS ENG. LABS	1- 3	1 1/8	- 1/8	-16.6
N	TEXAS INSTRUMENTS	69-115	68 7/8	-7 1/4	-9.5
O	ULTIMACC SYSTEMS INC	1- 2	1 1/2	0	0.0
N	VARIAN ASSOCIATES	6- 13	5 7/8	-1 3/8	-22.9
N	WANG LABS.	8- 20	8 1/4	-1 1/2	-15.3
N	XEROX CORP	76-127	75 3/4	-6 1/2	-7.9
	LEASING COMPANIES				
O	ARESNAHAN CORP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	7/8	- 1/8	-12.5
A	COMMERCE GROUP CORP	3- 8	2 3/4	- 1/8	-4.3
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 8	7/8	0	0.0
O	COMP. INSTALLATIONS	1- 1	1/4	0	0.0
N	DATRONIC RENTAL	1- 1	3/4	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	2- 5	2 1/2	- 1/8	-4.7
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	1	- 1/8	-11.1
A	GREYHOUND COMPUTER	2- 6	2 1/8	- 5/8	-22.7
A	ITEL	3- 8	2 7/8	- 3/8	-11.5
N	LEASCO CORP	5- 12	7 1/2	- 7/8	-10.4
O	LEASPAC CORP	1- 2	5/8	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	MRA INC	1- 5	1 3/8	- 3/8	-21.8
A	PIONEER TEX CORP	2- 10	2 1/2	+ 1/8	+11.1
A	ROCKWOOD COMPUTER	1- 1	5/8	0	0.0
N	U.S. LEASING	5- 24	6 1/4	- 1/4	-3.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 1974 RANGE (1)	CLOSE SEP 12 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	3/4	0	0.0
A	APPLIED DATA RES.	2- 3	1 5/8	- 1/8	-7.1
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	22 1/2	- 1/8	-1.0
O	BRANDON APPLIED SYST	1- 1	1/4	- 1/8	-33.3
O	CENTRAL DATA SYSTEMS	4- 6	3	-1 1/4	-20.8
O	COMPUTER DIMENSIONS	2- 3	1 1/2	0	0.0
O	COMPUTER HORIZONS	1- 5	1 1/4	0	0.0
O	COMPUTER NETWORK	1- 2	1 1/8	- 1/8	-10.0
N	COMPUTER SCIENCES	2- 4	2	0	0.0
O	COMPUTER TASK GROUP	1- 1	3/8	+ 1/8	+50.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 1/4	0	0.0
O	COMRESS	1- 1	1/8	- 1/8	-50.0
O	COMSHARE	2- 4	1 7/8	0	0.0
N	CORDURA CORP	2- 4	1 5/8	- 1/8	-13.3
O	DATATAB	1- 3	1	- 1/8	-20.0
A	ELECT COMP PROR	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 25	12 5/8	-1 1/8	-6.1
O	INFONATIONAL INC	1- 2	1/2	0	0.0
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IRS COMPUTER MARKET.	1- 1	3/8	- 1/8	-18.2
O	KEANE ASSOCIATES	2- 8	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	1 5/8	- 1/8	-7.1
O	LOGICON	2- 5	3	0	0.0
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
O	NATIONAL CSS INC	10- 37	18 1/2	- 1/2	-3.3
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	21- 30	19 3/8	-1 1/8	-5.3
N	PLANNING RESEARCH	2- 3	2 1/4	- 1/8	-5.2
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	1- 5	1 1/8	- 1/8	-10.1
O	SCIENTIFIC COMPUTERS	1- 1	5/8	- 1/8	-16.6
O	SIMPLICITY COMPUTER	1- 1	3/4	+ 1/4	+50.0
O	TCC INC	1- 1	3/8	- 1/8	-25.0
O	TYMSHARE INC	7- 12	7 3/8	- 3/8	-4.8
O	UNITED DATA CENTER	2- 4	2 1/2	0	0.0
A	UPS SYSTEMS	2- 4	1 5/8	- 1/8	-7.1
N	WYLY CORP	2- 5	2	- 1/8	-5.8
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	5- 11	4 1/2	- 3/8	-7.6
O	ADVANCED MEMORY SYS	1- 7	1 1/2	0	0.0
N	AMPEX CORP	3- 5	3 1/8	0	0.0
O	ANDERSON JACOBSON	2- 4	2 1/4	+ 1/4	+12.5
O	AVENIVE MEDICAL ELEC	2- 7	2 1/8	0	0.0
A	BOLT,BERANEK & NEW	5- 9	4 7/8	-1 1/8	-10.7
N	BUNKER-RAMO	5- 8	8 1/2	- 1/8	-2.7
A	CALCOMP	8- 11	5 1/2	-1 1/8	-16.9
O	CAMBRIDGE MEMORIES	5- 16	4 7/8	- 3/4	-13.3
O	CENTRONICS DATA COMP	10- 23	10 1/4	-2	-16.3
O	CODEX CORP	8- 15	10	- 1/4	-2.8
O	COGNITRONICS	1- 2	3/8	0	0.0

EXCH		PRICE 1974 RANGE (1)	CLOSE SEP 12 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 2	1/2	- 1/8	-20.0
A	COMPUTER EQUIPMENT	1- 2	1 1/4	- 1/4	-16.6
O	COMPUTER MACHINERY	2- 5	2 1/8	- 1/4	-10.5
O	COMPUTER TRANSCEIVER	1- 2	3/4	- 1/8	-14.2
N	CONRAC CORP	12- 22	11 5/8	0	0.0
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	6- 13	5 3/4	-1 1/8	-16.3
A	DATA PRODUCTS CORP	3- 4	2 7/8	- 1/8	-4.1
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	2 3/8	- 1/4	-9.5
O	DECISION DATA COMPUT	3- 13	2 7/8	-1 1/2	-34.2
O	DELTA DATA SYSTEMS	1- 2	3/4	0	0.0
O	DI/AN CONTROLS	1- 2	5/8	0	0.0
M	ELECTRONIC M & M	2- 4	1 3/4	- 1/8	-6.6
O	FABRI-TEK	1- 3	1	- 3/8	-27.2
O	GENERAL COMPUTER SYS	2- 4	1 3/8	0	0.0
N	GENERAL ELECTRIC	31- 65	31	-5 5/8	-15.3
N	HAZELTINE CORP	3- 7	2 7/8	- 1/4	-8.0
O	INFOREX INC	2- 5	3 1/8	+ 1/8	+4.1
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	8- 14	6	- 1/2	-5.8
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 5	2 3/4	0	0.0
A	MILGO ELECTRONICS	7- 18	7 1/8	-1 1/8	-13.6
N	MOHAWK DATA SCI	2- 4	1 1/2	- 1/8	-7.6
O	ODEC COMPUTER SYST.	1- 3	1	0	0.0
O	OPTICAL SCANNING	3- 6	3 1/2	0	0.0
O	PERTEC CORP	2- 6	2 1/8	0	0.0
A	POTTER INSTRUMENT	2- 5	1 7/8	- 1/8	-6.2
O	PRECISION INST.	1- 3	3/8	0	0.0
O	QUANTOR CORP	2- 8	2 1/2	0	0.0
O	RECOGNITION EQUIP	2- 5	1 5/8	- 3/4	-31.5
N	SANDERS ASSOCIATES	2- 8	2	- 5/8	-23.8
O	SCAN DATA	1- 2	1 1/8	0	0.0
O	STORAGE TECHNOLOGY	8- 15	7 3/4	- 1/2	-6.0
O	SYCOR INC	4- 13	4 1/2	-1 3/4	-26.0
O	TALLY CORP.	2- 8	2 3/8	+ 1/8	+5.5
O	TEC INC	2- 7	2	- 3/4	-27.2
N	TEKTRONIX INC	24- 48	23 5/8	- 3/8	-1.5
N	TELEX	3- 8	2 5/8	- 1/8	-4.5
O	WANGCO INC	6- 13	6	- 1/8	-4.0
O	WILTEK INC	3- 2	2 3/4	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/4	- 1/8	-5.5
A	BARRY WRIGHT	4- 7	4	- 1/8	-3.0
O	CYBERMATICS INC	1- 2	3/4	- 1/8	-14.2
A	DATA DOCUMENTS	23- 54	32 3/4	-2 7/8	-8.0
O	DUPLEX PRODUCTS INC	6- 17	13 1/4	-2	-13.1
N	ENNIS BUS. FORMS	5- 7	4 5/8	- 1/8	-5.1
O	GRAHAM MAGNETICS	6- 11	6	- 1/2	-7.6
O	GRAPHIC CONTROLS	7- 11	6 3/4	- 1/2	-6.8
N	3M COMPANY	55- 78	55 1/8	-3 3/8	-5.7
O	MOORE CORP LTD	40- 57	40	-1 1/4	-3.0
N	NASHUA CORP	24- 45	28 1/2	- 1/2	-2.0
O	REYNOLDS & REYNOLDS	9- 35	8 1/2	-1 1/2	-15.0
O	STANDARD REGISTER	10- 16	10	-1	-9.0
O	TAB PRODUCTS CO	5- 11	4 3/4	+ 1/4	+5.5
N	VARCO	15- 23	15 3/8	-1 1/2	-6.8
A	WABASH MAGNETICS	4- 7	4	- 1/8	-3.0
N	WALLACE BUS FORMS	14- 24	16 7/8	- 5/8	-3.5

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